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JUNE 1988

PINNIPED RESEARCH CONDUCTED AT SAN CLEMENTE ISLAND DURING 1984

By

Jeanne Wexler and Charles W. Oliver

ADMINISTRATIVE REPORT LJ-88-16

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Jeanne Wexler and Charles W. Oliver

National Marine Fisheries Service
Southwest Fisheries Center
La Jolla, California, 92038

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INTRODUCTION

Pinniped research has been conducted at San Clemente Island (SCI) by Southwest Fisheries Center (SWFC) personnel since July, 1981 (Oliver and Lowry 1987, Oliver, et al. 1988). SCI is one of four islands in the Southern California Bight (SCB) where California sea lion (Zalophus californianus) and northern elephant seal (Mirounga angustirostris) rookeries exist (Seagars, et al. 1985). Harbor seals (Phoca vitulina richardsi) also breed at SCI and other islands within the SCB (Stewart and Yochem 1985). Research conducted at SCI has been directed toward monitoring island population trends of these three species of pinnipeds.

In this report, we discuss seasonal distribution and numbers of the three pinniped species, food habits of California sea lions, salvage of all dead marine mammals, data obtained from tagged sea lions and elephant seals, disturbance factors, and cetacean sightings during January through December 1984. This report presents the fourth year of research conducted by the SWFC at SCI.

STUDY AREA

SCI is the third largest and the southernmost United States-owned island in the SCB. It is administered by the Department of the Navy, Naval Air Station at North Island, San Diego, California, and is used primarily for military operations. Our principal study area was located on the southwest side of SCI from Seal Cove Point to an area we named "The Shack", a linear distance of approximately 7.5 km (Figure 1). We divided this area into three distinct sub-areas: 1) North of Mail Point, 2) Mail Point, and 3) South of Mail Point (Figure 2). Periodically, data were also collected between "The Shack" and Lost Point, a linear distance of approximately 3.5 km. This area is adjacent and to the south of the principal study area. Two other areas, China Point and Northwest Harbor Islet, were each observed once during the year. Occasional aerial surveys were made around the island to note distribution outside the study area.

The principal study area is characterized by a cactus and rock terrain above the haulout and rookery areas. Haulout areas include rocky points and beaches as well as seven dirt covered flat areas above a cobblestone or rock shoreline. Haulouts had or were given specific names by the authors according to nautical charts, terrain characteristics or personal preferences (Figures 1-3).

METHODS

Counts and Distribution of Pinnipeds

We conducted nine ground surveys within the principal study area during 1984 (Table 1). We usually censused sea lions and elephant seals over a two-day period. Counts were generally made from Seal Cove Point to Mail Point on one day, and continued from Mail Point to Arch Rock the next day. We were able to obtain complete counts of sea lions and elephant seals during those trips which included observations from atop Mail Point (Figure 3). From there animals could be surveyed below the Flat Area and on the southwest, northwest and north sides of Mail Point. If we did not ascend Mail Point, counts were considered incomplete. Complete counts were obtained in January, February, March, on July 26 and in November. On July 26 and November 16, complete counts were made within a single day. Incomplete counts at the Mail Point area were obtained during May, June, July 20 and September trips.

We censused pinnipeds using 9x30 or 10x50 binoculars while remaining concealed behind terrain features. We were able to approach most animals to within 50 meters, and often much closer, without disturbing them. Animals in some areas, primarily the islands below Seal Cove Point and offshore of Tiki Head Beach (Figure 2), were censused at much greater distances. We occasionally disturbed some animals during the peak pupping season in July while obtaining a complete count of sea lion pups, and during tagging efforts in March for elephant seals and in September for sea lions. Census data were recorded on field maps converted from aerial photographs of the coastline (Appendix I). In addition to animals being censused in the principal study area, pinnipeds were censused in the China Point area in September and at Northwest Harbor Islet in October.

We categorized as many animals as possible according to age and sex. Sea lions and harbor seals were counted as either pups-of-the-year or non-pups. Sea lion pups of 1983 are animals born during the summer of 1983 and counted as 1983 pups through June of 1984. Live sea lion pups of 1984 were first noted on June 15, although no pinniped observations were made between May 7 and June 14. Non-pups consisted of adults, subadult males, juveniles and yearlings. Elephant seals were classified as adults, subadults, yearlings, weaned pups or unweaned pups.

We made counts of harbor seals at "The Shack", a haulout approximately 1 km south of Arch Rock (Figure 2). These counts were usually performed two days after sea lions and elephant seals had been censused and were obtained from a distance of approximately 100 meters using binoculars.

We made six aerial surveys of the island (Table 2). Aerial surveys were conducted around the entire island on February 10 and October 16. Partial surveys were flown on January 13, April 25, July 5 and July 25. A complete island survey results if the two July surveys are combined. We conducted aerial surveys to locate any pinnipeds outside the principal study area and estimate their numbers. We obtained rough estimates of numbers within the principal study area during aerial surveys because we felt the ground data provided more accurate counts.

The aerial survey team consisted of a pilot and two observers. Surveys were flown in a Cessna 337 (Skymaster) offshore between 50-200 meters at an altitude of 61 meters and a ground speed of 90-100 knots. Times, locations, estimates of pinniped group sizes and comments were recorded on tape. Locations were recorded when the aircraft was abeam of sightings. Location was determined with a Texas Instrument 9100 Loran-C Navigational unit. The airspace around SCI is controlled by the U.S. Navy and attempts at conducting low-level surveys of the island were coordinated with them on the day of each survey. Based on past experience, we found that we were able to survey the entire island during flights that were conducted in the morning.

California Sea Lion Food Habits Study

We collected scats and spewings at all three sea lion haulout areas: 1) north of Mail Point; 2) Mail Point; and 3) south of Mail Point (Figure 2); south of Mail Point accounted for most of the samples. We collected samples after the animals had left their haulouts. With the exception of the Mail Point area, where both sea lions and elephant seals haul out, all scats and spewings collected were those of sea lions. Two fresh scats found at Mail Point, near hauled-out elephant seals, were collected and presumed to be from this species. During the collection of fresh and dry scats and spewings, the haulout areas were cleared of all old, uncollectable scats. Clearing areas during each trip defined a time frame for scats found on the next trip. Scats and spewings were individually bagged and labeled, and stored in a freezer.

In the laboratory, the collected scats and spewings were sorted, soaked, and run through a series of screenings, and the prey items found in the samples were sorted and identified (Lowry 1986; Lowry and Oliver 1986). Samples were sorted and recorded by date and area, and labeled accordingly. They were then soaked in water and liquid detergent for three to five days. Scats and

spewings were washed through three different sizes of mesh screens (2.8mm, 1.4mm, and 1.0mm) so that prey hard parts could be recovered (i.e.: fish otoliths, cephalopod beaks, fish teeth, and cartilaginous vertebrae). Cephalopod beaks were stored in ethanol. Otoliths and other hard parts were air dried and stored in vials.

Prey hard parts, primarily otoliths and beaks, were identified by M. Lowry (SWFC). The prey hard parts that exhibited characteristics similar to those of a particular prey but were either too digested or broken to be positively identified or had unknown characteristics were identified as questionable. Percent frequency of occurrence (PFO) was calculated for all positive and questionable identifications from prey items found in California sea lion scats (Lowry and Oliver 1986). PFO was calculated only for scat and spewing samples containing prey items. Percent frequency of occurrence of a prey is defined as the proportion of scats which contain that prey item. The total PFO of all prey will not equal 100% since more than one prey can occur per scat sample. With the exception of seven scat samples which were omitted due to procedural errors during laboratory handling, all scat and spewing data collected were entered into the SWFC computer database SCATDB.DAT (Lowry 1986).

Salvage of Dead Marine Mammals

When possible, we salvaged dead marine mammals at all haul-out areas and during five beach surveys from Lost Point to "The Shack". Two other areas not normally surveyed, China Point and the Northwest Harbor Islet, were surveyed for strandings during September and October, respectively. To reduce the amount of disturbance to live animals, we generally did not examine carcasses in most of the Mail Point area, nor on the beaches below the Uppers to south of Mail Point (Figure 2). We noted all dead animals at these locations, whether or not we salvaged the carcasses. All marine mammal carcasses were marked with red surveyor's tape so that carcasses would not be mistaken for recent strandings during subsequent trips.

Specimen parts were collected from dead sea lion pups and all tagged, dead pinnipeds for further analysis. Foreflippers from freshly dead pups and tagged animals were collected for osteological studies of age determination. Teeth were also collected for age determination. All specimen parts are stored at the SWFC. Pinniped salvage data were recorded on a pinniped life history data form (Appendix II) and entered into the SWFC Pinniped Life History database PINNLIFE.DAT.

Tagging and Resights of Tagged Pinnipeds

We tagged northern elephant seals under the authority of Marine Mammal Protection Act Permit 404 in late March at Mail

Point. Pups were tagged with white riese[1] tags in the inter-digit webbing closest to the outer edge of each rear flipper. We double-tagged pups in order to obtain data on tag loss. Tagging of non-pups was performed while animals were resting and generally resulted in only a single tag being placed on a rear flipper. Data on the age, sex, location, tag number and color, and physical condition of each animal were recorded in addition to tooth eruption and molt condition for weaned pups.

We tagged California sea lions under the authority of Marine Mammal Protection Act Permit 347 in mid-September, approximately two to three months after the onset of the breeding season. All tagging occurred in the Mail Point area where pups were most accessible and abundant. Two areas at Mail Point are particularly conducive to tagging large numbers of pups at a low tide: the Big Pool area and the North Face of Mail Point (Figure 3). Seven to ten persons participated in the tagging operation over a two-day period (September 21-22). Personnel stalked small groups or herded larger groups against the sides of rocky cliffs at North Face and into the Big Pool area. Animals were then captured with hoop nets. After capture, pups were weighed, sexed and tagged with white riese tags. Tags were placed on the inside rear edge of each foreflipper close to the body. We double-tagged to obtain data on tag loss. Data on the sex, location, tag number and color, pup weight, and general physical condition were recorded for each animal. We recorded tag information on coding forms and entered these data into the SWFC Pinniped Tag/Resight database STAGDB.DAT (Wexler 1985).

We noted resights of previously tagged pinnipeds during each census. Tags were read using either 9 x 30 binoculars, 10 x 50 binoculars, or a 20 x 45 spotting scope. Tag number, color, condition of tag, location of tag (left, right or both flippers) and animal age class, condition, association and behavior were recorded. This information was also coded and entered into the SWFC Tag/Resight database STAGDB.DAT (Wexler 1985).

RESULTS

Counts and Distribution of Pinnipeds

California Sea Lions

Numbers of California sea lion pups and non-pups are presented for all three sub-areas within the principal study area in Table 1 and Figures 4-7. The numbers of 1983 cohort pups gradually declined from January through June. We found a dead,

[1] Reference to trade name does not imply endorsement by the National Marine Fisheries Service.

premature pup of the 1984-cohort in March and two more in early May. The first live pups of the 1984-cohort were observed in June with the peak number of pups observed in late July (411 pups). The number of pups that we observed in 1984 then gradually declined throughout the rest of the year. Pups were most abundant in the Mail Point area. Non-pups increased in numbers in late spring and declined sharply after July.

In addition to ground counts obtained within the principal study area, the China Point area was surveyed on September 23 and Northwest Harbor Islet was surveyed on October 31. No live animals were seen at China Point during the survey in September. Fifty-five sea lions (4 pups, 51 non-pups) were observed at Northwest Harbor Islet in October. Approximately 20 sea lions were observed by California Department of Fish and Game (CDFG) personnel at China Point in January (D. Hanan, pers. comm.). A white tag on a foreflipper was observed on one of these sea lions, indicating movement from its original tagging site at Mail Point.

With the exception of the Northwest Harbor Islet, sea lions were observed outside the study area on only two occasions during aerial surveys (Table 2). During a February survey of the entire island, six sea lions were observed at the southeast end of the island, and a single animal was observed on the east side of the island during a July flight. Sea lions were observed on the Northwest Harbor Islet during all but the January flight, with the greatest numbers occurring during April (approximately 175 animals). Between 100 and 135 animals were seen during the month of July.

Northern Elephant Seals

Elephant seals were observed in all three sub-areas in the principal study area (Table 1). However, they were most abundant in the Mail Point area and seldom observed in other areas. Elephant seals were most abundant in May (53) while none were observed in July.

The age-class distribution of elephant seals is presented in Table 3. Pups born at SCI were only observed in winter (January-March). No more than three pups were observed during any observation period in winter. However, we observed 23 weaned pups in May, and 11 weaned pups in November in the Mail Point area. None of these pups bore SCI white tags and, with the exception of two pups tagged at San Miguel Island (SMI), they arrived from unknown origins. Yearlings were observed during each trip except in June and July. Subadult and adult males were observed only in January. Subadult and adult females were present from January through May. Unclassified non-pups were also observed in March-June and again in September.

During flights in January and February, northern elephant seals were sighted within the principal study area at Mail Point and Tiki Head Bridge Beach (Table 2, Figure 2) and outside the principal study area on the eastern side of the island. No elephant seals were observed during the other four flights between April and October. Personnel from the CDFG aboard a vessel (D. Hanan, pers. comm.) reported a sighting of three elephant seals at China Point on January 25, 1984.

Harbor Seals

We observed harbor seals at "The Shack" during ground counts for seven of the nine trips (Table 1). We did not survey this site during the other two trips. Counts indicated a peak number of non-pups in January when 15 subadults or adults were observed. Pups were observed only in March (six pups), and weaned pups were observed in June (four pups). Few animals were hauled out in July (three non-pups).

We also observed harbor seals within the principal study area north of Mail Point (one non-pup in March) and at Mail Point (one non-pup in May) during ground counts. In addition, 14 non-pups were observed during a ground census conducted outside the principal study area at Northwest Harbor Islet on October 31 during morning hours.

We observed harbor seals within and outside the principal study area during aerial flights (Table 2). Animals were sighted at "The Shack" during aerial flights in January, February, and April. Two animals were also seen within the study area (north of Mail Point) during the April flight. On three flights, harbor seals were observed outside the study area. Twenty-eight seals were observed at a few small coves to the southeast of Lost Point during the February flight, and one animal was seen there during the July 5 flight. Five animals were observed on the west side of the northwest end of the island in April, and 22 seals were sighted on the Northwest Harbor Islet in February.

California Sea Lion Food Habits Study

We collected one spewing and 368 scats from California sea lions during 1984 (Table 4). Seven of these scats were omitted from prey analysis due to procedural errors during laboratory processing. Prey remains were not found in 37 (10.2%) of the remaining 361 scats and therefore were not used in the PFO analysis. Positively identified otoliths, beaks and other prey remains from these scats and the spewing are included in a list of prey (Table 5a), and constitute 96.5% of all positive and questionable identifications. Those prey items not positively identified (questionable identifications) (Table 5b) constitute 3.5% of all positive and questionable identifications. Lowry and Oliver (1986) defined commonly occurring prey as those prey with PFO's of 10% or more. Of all positively identified prey,

we found six prey to commonly occur (PFO≥ 10%) in scats and the spewing. These are: 1) northern anchovy (Engraulis mordax), 50.0%; 2) pelagic red crab (Pleuroncodes planipes), 27.4%; 3) Pacific whiting (Merluccius productus), 26.5%; 4) rockfish (Sebastes spp.), 19.4%; 5) octopus (Octopus sp.), 14.8%; and, 6) blacksmith (Chromis punctipinnis), 10.2% (Table 5a). These prey constituted 87.6% of all prey that were positively identified in scats and the spewing. Five new prey (Table 5a), with PFO's less than 3.0%, were identified in 1984 scats that were not found by Lowry and Oliver (1986) in previous years. These five prey are: medusafish (Icichthys lockingtoni), plainfin midshipman (Porichthys notatus), Squid (Ocythoe tuberculata), the eelpout (Zoarcidae) and the soupfin shark (Galeorhinus galeus).

In addition to the sea lion scats and spewing collected in 1984, two scats were obtained from northern elephant seals. Of these two scats, one contained no prey remains while the other contained one squid beak (Mastigoteuthis pyrodes).

Salvage of Dead Marine Mammals

California sea lions were the only stranded pinnipeds observed and examined during the year (Table 6, Appendix III). Most dead strandings were found either in the principal study area at Mail Point (28.5%) or outside the study area between Lost Point and "The Shack" (27.5%). Other strandings noted within the principal study area were south of Mail Point (15.4%) and north of Mail Point (12.1%). Strandings were also observed at Northwest Harbor Islet (8.8%) and China Point (7.7%). We observed more strandings of pups from the 1983 cohort (48.3%) than of non-pups (28.6%) or pups of the 1984 cohort (23.1%). Numbers of dead pups from the 1983 cohort were most abundant in January (17 pups), whereas dead pups of 1984 were more abundant in September (8 pups). Of the 1983 pups found dead, three had been tagged on SCI (Appendix III). Only four premature pups were noted during the year. Dead strandings of non-pups were most apparent in February when seven animals were examined.

Tagged Pinnipeds

Ten northern elephant seals were either single or double-tagged with white-riese tag numbers 363-371 (Appendix IV). Tag number 366 was inadvertently applied to two separate animals. The ages of elephant seals tagged included 3 pups born at SCI, 3 yearlings, 1 subadult and 3 adults.

We double-tagged 145 California sea lion pups of the 1984 cohort and 1 yearling with white riese tag numbers 372-517 (Appendix V). Thirty-five percent of the pups counted during the peak pup count in July (411) were tagged during September. The sex ratio of tagged pups did not deviate significantly ($X^2_{0.05,1}$ = 0.17) from the expected 1:1 ratio; 75 (51.7%) were males and 70 (48.3%) were females (Tables 7-8). The mean weight of male pups

(14.6 kg) was significantly higher than the mean weight of female pups (13.1 kg) ($t_{0.05,143} = 2.99$, $P = 0.003$).

The general physical condition of sea lion pups tagged in September was rated as good; however, pups appeared slightly smaller than pups tagged in 1982 and 1983 from the same area and during the same time of month (Oliver and Lowry 1987, Oliver et al. 1988). Chi-square analysis of the sex ratios for each of the three years (1982-1984) showed no significant deviations from the expected 1:1 ratio (Table 7). The overall ratio for the period of 1982 to 1984 did not deviate significantly ($X^2_{0.05,1} = 0.02$) from the expected 1:1 ratio; 195 (49.6%) were males and 198 (50.4%) were females. However, since male pup weights were found to be significantly higher than female pup weights in all three years, male and female weights were examined separately for each of the three years. Results of a one-way analysis of variance for male pup weights indicate significant differences among the three years ($F_{0.05(2,192)} = 54.22, 0.01<P<0.025$). Male pup weights in 1983 and 1984 had lower mean values than in 1982 (Figure 8). However, the Newman-Keuls multiple range test (Zar 1974) indicates significant differences among mean male pup weights for each of the three years (Table 9). Significant differences in female pup weights were also observed among the three years ($F_{0.05,(2,195)} = 59.70$, $0.01<P<0.025$, one-way ANOVA). The Newman-Keuls multiple range test indicates that the mean female pup weights for 1983 and 1984 were not significantly different, but each was significantly different from that of 1982 (Table 10; Figure 8).

Tag Resights

Sea lions and northern elephant seals, tagged at areas other than SCI, were resighted during various times of the year at SCI (Table 11). These resights included sea lions or elephant seals from San Nicolas Island (SNI) (two elephant seal yearlings and one pup of the year), San Miguel Island (SMI) (two elephant seal pups of the year), Santa Barbara Island (SBI) (one sea lion pup of the 1983 cohort) and Marine Mammal Rehabilitation Centers (two adult sea lions). Most resights occurred in May when peak numbers of sea lions and elephant seals were observed hauled out.

We collected tag resight data on both sea lions and northern elephant seals which had previously been tagged at SCI. These data were collected during each trip and the total number of unique tag numbers resighted during each trip is shown in Table 12. The resights shown in Table 12 include individuals which may have been resighted on more than one trip. We were unable to read some tags on animals due to the tag being only partially visible, too distant to read, or illegible. Tag resights included 3 dead pups from the 1983 cohort (Tag numbers 244, 248, 345), two California sea lion subadult-females tagged with Roto-tags in either 1981 or 1982, one adult female elephant seal tagged as an adult in 1982 (Tag number 07?), one elephant seal pup tagged in

March of 1984 and seen in May (Tag number not obtained), and one elephant seal yearling seen in May (Tag number 369). Observed numbers of both elephant seals and sea lions, that had been tagged at SCI, decreased after March.

Three SCI-tagged pinnipeds were resighted at other locations in 1984. A subadult male elephant seal (Tag number 74 white roto tag), which was tagged as a pup in February 1982, was sighted at SNI on 23 September 1984 (B. Stewart, pers. comm.). A juvenile sea lion with a white tag (number illegible) was observed at Ojo de Liebre, Baja California on February 12 (M. Lowry, pers. comm.), and another juvenile with an illegible tag was observed at Monterey on April 13 (K. Nicolson, pers. comm.).

DISCUSSION

Counts and Distribution of Pinnipeds

California Sea Lions

Our aerial surveys indicated that all California sea lion breeding, and most hauling out at SCI, occurs either in our principal study area or at the Northwest Harbor Islet. The number of sea lions observed during ground counts within the principal study area fluctuated throughout 1984 (Table 1, Figures 4-7). Numbers of non-pups observed increased in late spring and declined sharply after July following the breeding season. This is probably related to a migration southward in early summer by subadult and adult males to the rookery areas and northward following the breeding season (Bartholomew 1967). The number of pups from the previous year (1983) declined from January through June. Movement to other areas, mortality, extended feeding forays and incomplete counts may have contributed to this observed decline in numbers of 1983 pups.

Pup counts were lower in 1984 (411 pups) and 1983 (353 pups) (Oliver, et al. 1988) than that reported in 1981 (666 pups) and 1982 (773 pups) (Oliver and Lowry 1987). Lower pup counts in 1983 and 1984 may have occurred in response to the 1982-1983 El Niño. A decline in pup production during El Niño years was also observed at SBI (Lowry, et al. 1987) and SNI (Stewart and Yochem 1986). Heath and Francis (1983) observed increased duration of feeding trips by females and a reduction in copulations at SNI during 1982 and 1983, which may have had an effect on pup production during 1984. Lowry, et al. (1987) reported an increase in pup production at SBI following the El Niño years. We also expect to observe an increase in pup production at SCI after this period.

The Northwest Harbor Islet was not regularly surveyed and a pup count was not obtained there in July. However, we estimated 100 animals during an aerial survey on July 5 and 135 animals during an aerial survey on July 27. Some pups may have been

born there, but we estimate that the total number is probably less than 50 based on the aerial surveys in July. The highest numbers of sea lions seen at the Northwest Harbor Islet occurred during April (175) and July (135). We estimate the number of sea lions on the island to have ranged from a maximum of 1,387 in July to a minimum of 407 in November.

Northern Elephant Seals

Data from our aerial surveys and ground observations indicate that all northern elephant seal breeding and most hauling out at SCI occurs at Mail Point. Age-class distributions and numbers of elephant seals varied seasonally within the principal study area (Table 3). Few or no elephant seals were observed at SCI during June and July. Only three pups, were born on SCI during 1984. Weaned pups (23 animals) and other age classes (30 animals) were observed in greater numbers in May than in other months.

Elephant seals may occasionally use other locations outside the principal study area. Three elephant seals were observed at China Point on January 25 (D. Hanan, CDFG, pers. comm.). Small numbers of elephant seals were difficult to sight during aerial surveys over the mostly rocky shoreline at SCI. A single sighting, outside the study area, was made on the eastern side of the island during a flight on February 4 (Table 2), and lends support to the conclusion that other areas may occasionally be used by northern elephant seals.

Harbor Seals

Data from our ground observations (Table 1) indicate that harbor seals consistently haul out at "The Shack". Few animals were observed hauled-out at "The Shack" in July. However, this count was taken in the morning and other studies have shown that peak numbers of harbor seals haul out in the early afternoon at the Southern California Channel Islands (Stewart 1981, 1984). Thus, the morning count may not be indicative of the actual number of animals. Previous studies at SCI indicate that harbor seals have maintained a small rookery at "The Shack" since 1982 (Oliver and Lowry 1987, Oliver, et al. 1988). The number of pups observed at "The Shack" in 1984 (6 pups) was slightly higher than the count for 1982 when 2 pups were first noted at this site.

Aerial surveys of the island indicate that other areas outside the principal study area are also used by harbor seals, primarily between Lost Point and China Point and at the Northwest Harbor Islet (Table 2). We were able to obtain data on harbor seal distribution at SCI, but are unable to estimate the island population of harbor seals since we lack complete census data.

California Sea Lion Food Habits

Our study on the food habits of California sea lions at SCI is a continuation of work initiated in 1981. We chose to rank the positively identified prey by PFO (Table 5a) and used the definition of common prey described by Lowry and Oliver (1986) as those prey having a PFO $\geq$ 10%.

During 1984, positively identified prey with a PFO of 10.0% or more varied in composition and rank when compared with the prey composition reported by Lowry and Oliver (1986) for the period September 1981 to March 1983. Pelagic red crab (27.4 PFO) and octopus (14.8 PFO) ranked high in 1984 but were not commonly found during 1981-1983 (3.0 and 1.0 PFO, respectively). Market squid (Loligo opalescens) was found to occur as a prey item in scats (1.8 PFO) but was not found to rank as highly as in 1981 to 1983 (21.0 PFO). Top ranked prey during 1981-1983 were jack mackerel (46.0 PFO) and northern anchovy (39.0 PFO). In 1984, we found northern anchovy (50.0 PFO) to rank as the most common prey, and jack mackerel had declined to seventh in rank (7.4 PFO).

The differences in prey composition between 1984 and 1981-1983 (Lowry and Oliver 1986) may be associated with prey availability during anomalous ocean conditions from the 1982-1983 El Niño event (Barber and Chavez 1983). The effects of El Niño caused reduced productivity offshore from California and in turn affected those prey that feed directly on zooplankton such as anchovy and squid (Brownlee 1984). Barber and Chavez (1983) reported that some prey, such as jack mackerel, were displaced closer inshore away from the lower productivity offshore, thus increasing depredation by fish tolerant of warmer temperatures. It is likely that similar oceanographic conditions, which occurred off South America (Barber and Chavez 1983), resulted in a similar effect on jack mackerel off California. Other prey, such as squid, simply produced fewer young or did not spawn at all (Brownlee 1984). The less frequent occurrence of squid in the diet of California sea lions during 1984 may have been associated with a decline in squid production.

Salvage of Dead Marine Mammals

Information from areas sampled regularly for dead strandings may indicate some seasonality of mortality. However, dead carcass counts, whether counted periodically or seasonally, may underestimate actual mortality due to loss of carcasses and scanning error (e.g., Heath and Francis 1984). Carcasses of 1983 cohort pups were more prevalent at the beginning of the calendar year. This may partially explain a decrease in the number of live 1983 cohort pups through June. Three premature pups were noted in 1984 compared to 6-13 premature pups in previous years. This may indicate a lower pup mortality rate for the 1984 season.

Tagging and Tag Resight Data

Analyses of data collected on sea lion pup weights during tagging operations indicated a significant reduction in both male and female pup weights from 1982 to 1984. Heath and Francis (1983) also found a significant decline in pup weights at SNI from 1982 to 1983. Pup weights are an indication of condition, and a reduction in pup weights may have occurred in response to oceanographic changes caused by the 1982-1983 El Niño. However, analyses which include pup weights from post-El Niño years are necessary before the significance of El Niño conditions on pup weights can be further elucidated.

In addition to the smaller size of these pups when compared with the size of pups in previous years, open lesions around the genital and anal areas and on the ventral surface of the flipper area were observed on 7.6% of the pups tagged. These lesions may be associated with the SMI Virus (Smith, et al 1977).

Five of eight resights of animals tagged at other areas occurred in May (Table 11). Peak numbers of sea lions and elephant seals were hauled out on SCI at this time, just before the onset of the sea lion breeding season and during the northern elephant seal molt (Table 1, Figure 7). Inter-island movement was evident from the presence of two elephant seal weaned-pups and two yearlings previously tagged at SMI and SNI, respectively, and a sea lion pup tagged on SBI (Table 11). The exact origin of release is unknown for two California rehabilitation-center-tagged sea lions observed during February and May, since the tag numbers could not be read. However, this is further evidence of movement to the island from the coast of California as well as from other islands. Resights of the three SCI-tagged pinnipeds at other locations indicate movement as far north as central California and as far south as central Baja California.

Observed numbers of 1983 SCI-tagged pups declined after March (Table 12). This coincides with the decrease in observed numbers of 1983 pups (tagged and untagged) after March (Figure 7). Seasonal dispersion (or migration), mortality, tag loss and lengthening of feeding forays may have affected the number of 1983 pups observed on SCI during the year.

Disturbance Factors

The pinnipeds on SCI coexist with various types of human activities. It is not known how often these activities occur in proximity to the hauled out animals, or to what degree disturbance affects these animals. Past observations and discussions with island personnel indicate the following activities result in disturbance: 1) naval and marine personnel observing animals at the rookery and haulouts, 2) military

operations involving shelling and low-flying aircraft over these areas, and 3) commercial and sport fishing vessels operating within 50-100 meters of rookery areas.

Cetaceans

No dead cetaceans were salvaged on SCI during 1984. We did observe grey whales within approximately one nautical mile or less of Mail Point during January 19-21 and again during February 23-24. We observed 15 whales on January 19, 5 on January 20, and "a few" on the 20th. No other observations of cetaceans were made within the study area.

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Table 1. Numbers and distribution of pinnipeds within the study area between "The Shack" and Seal Cove Point at San Clemente Island, by data collection period, during 1984.

Trip Period Date	Location[1]	CALIFORNIA SEA LION 1983 Pups	1984 Pups	1984 Non-pup	Total Number	NORTHERN ELEPHANT SEAL 1984 Pups	1984 Non-pup	HARBOR SEAL 1984 Pups	1984 Non-pup
1/19-23	SMP	95	0	359	454	0	2	0	15
	MP	45	0	132	177	2	18	0	0
	NMP	74	0	86	160	0	0	0	0
	Totals	214	0	577	791	2	20	0	15
2/23-27	SMP	97	0	346	443	0	1	0	11
	MP	23	0	39	62	3	1	0	0
	NMP	50	0	68	118	0	0	0	0
	Totals	170	0	453	623	3	2	0	11
3/23-26	SMP	73	0	570	643	0	0	6	11
	MP	30	0	217	247	3	9	0	0
	NMP	44	0	130	174	0	1	0	1
	Totals	147	0	917	1064	3	10	6	12
5/3-7	SMP	43	0	426	469	0	0	0	8
	MP[2]	55	0	553	608	23	30	0	1
	NMP	12	0	107	119	0	0	0	0
	Totals[2]	110	0	1086	1196	23	30	0	9
6/14-18	SMP	25	5	295	325	0	0	4	6
	MP[2]	21	67	293	381	0	1	0	0
	NMP	17	26	219	262	0	0	0	0
	Totals[2]	63	98	807	968	0	1	4	6
7/20-23	SMP	-	10	275	285	0	0	0	3
	MP[2]	-	178	246	424	0	0	0	0
	NMP	-	94	288	382	0	0	0	0
	Totals[2]	-	282	809	1091	0	0	0	3

[1]SMP - "The Shack" to Mail Point (3.0 km of coastline).
MP - Mail Point area (0.5 km of coastline).
NMP - Mail Point to Seal Cove Point (4.0 km of coastline).
[2]Incomplete count for area or trip.

Table 1. continued.

Trip Period Date	Location[1]	CALIFORNIA SEA LION 1983 Pups	CALIFORNIA SEA LION 1984 Pups	CALIFORNIA SEA LION 1984 Non-pup	CALIFORNIA SEA LION Total Number	NORTHERN ELEPHANT SEAL 1984 Pups	NORTHERN ELEPHANT SEAL 1984 Non-pup	HARBOR SEAL 1984 Pups	HARBOR SEAL 1984 Non-pup
7/26-27	SMP	-	23	231	254	0	0	-No Count-	
	MP	-	262	383	645	0	0	0	0
	NMP	-	126	227	353	0	0	0	0
	Totals	-	411	841	1252	0	0	0	0
9/19-24	SMP	-	20	108	128	0	0	-No Count-	
	MP[2]	-	124	86	210	0	15	0	0
	NMP	-	132	62	194	0	0	0	0
	Totals[2]	-	276	256	532	0	15	0	0
11/16-19	SMP.	-	78	141	219	0	0	0	9
	MP	-	66	37	103	11	4	0	0
	NMP	-	57	28	85	0	0	0	0
	Totals	-	201	206	407	11	4	0	9

Table 2. Sightings of hauled-out pinnipeds obtained during aerial surveys of San Clemente Island during 1984.

Flight[1] Number	Marine[2] Mammal Species Code	Estimated Number of Animals	Sighting Number	Date	Local Time (Decimal Minute)	Location[3]	Position (Decimal Minute)
5	91	14	1.1	84/01/13	11 500	NMP	32 538 N 118 315 W
5	91	42	2.1	84/01/13	11 502	NMP	32 537 N 118 314 W
5	91	24	3.1	84/01/13	11 510	MP	32 531 N 118 311 W
5	92	8	3.2	84/01/13	11 510	MP	32 531 N 118 311 W
5	91	64	4.1	84/01/13	11 520	SMP	32 530 N 118 309 W
5	91	39	5.1	84/01/13	11 522	SMP	32 530 N 118 308 W
5	91	46	6.1	84/01/13	11 530	SMP	32 528 N 118 306 W
5	91	114	6.2	84/01/13	11 531	SMP	32 528 N 118 306 W
5	93	9	7.1	84/01/13	11 540	THE SHACK	32 523 N 118 304 W
6	91	6	1.1	84/02/10	10 010		32 476 N 118 255 W
6	93	9	2.1	84/02/10	10 040		32 495 N 118 281 W
6	93	19	3.1	84/02/10	10 045		32 505 N 118 296 W
6	93	1	4.1	84/02/10	10 070	THE SHACK	32 520 N 118 305 W
6	91	65	5.1	84/02/10	10 080	SMP	32 528 N 118 306 W
6	91	100	5.2	84/02/10	10 082	SMP	32 527 N 118 307 W
6	91	30	5.3	84/02/10	10 082	SMP	32 527 N 118 307 W
6	91	30	5.4	84/02/10	10 085	SMP	32 530 N 118 309 W
6	91	3	5.5	84/02/10	10 086	SMP	32 530 N 118 309 W
6	92	3	5.6	84/02/10	10 090	MP	32 531 N 118 311 W
6	91	30	6.1	84/02/10	10 130	NMP	32 537 N 118 314 W
6	92	2	6.2	84/02/10	10 130	NMP	32 537 N 118 314 W
6	91	12	7.1	84/02/10	10 132	NMP	32 539 N 118 315 W
6	91	3	8.1	84/02/10	10 137	NMP	32 543 N 118 321 W
6	93	22	9.1	84/02/10	10 215	NW HARBOR ISLET	33 023 N 118 351 W
6	91	12	9.2	84/02/10	10 215	NW HARBOR ISLET	33 023 N 118 351 W
6	92	1	10.1	84/02/10	10 259		32 547 N 118 275 W
7	93	4	1.1	84/04/25	10 220	THE SHACK	32 523 N 118 304 W
7	91	250	2.1	84/04/25	10 221	SMP	32 528 N 118 306 W
7	91	400	2.2	84/04/25	10 222	SMP	32 529 N 118 308 W
7	91	75	2.3	84/04/25	10 223	SMP	32 530 N 118 309 W
7	91	20	2.4	84/04/25	10 224	SMP	32 530 N 118 310 W
7	91	150	2.5	84/04/25	10 226	SMP	32 530 N 118 310 W

[1]Surveyed area: flight 5-Seal Cove Point to Lost Point; flight 6-Entire island; flight 7-Lost Point to East side of island; flight 8-East side of island from Pyramid Head Point to NW Harbor Islet; flight 9-West side of island from Pyramid Head Point to NW Harbor Islet; flight 10-Entire island.

[2]Species codes: 91-California sea lion; 92-Northern elephant seal; 93-Harbor seal

[3]Location: Within the study area; NMP-North of Mail Point; MP-Mail Point; SMP-South of Mail Point

Table 2. continued.

Flight[1] Number	Marine[2] Mammal Species Code	Estimated Number of Animals	Sighting Number	Date	Local Time (Decimal Minute)	Location[3]	Position (Decimal Minute)
7	91	400	2.6	84/04/25	10 228	MP	32 531 N 118 311 W
7	91	75	3.1	84/04/25	10 230	NMP	32 537 N 118 316 W
7	91	6	4.1	84/04/25	10 231	NMP	32 538 N 118 316 W
7	91	30	5.1	84/04/25	10 233	NMP	32 542 N 118 317 W
7	93	2	6.1	84/04/25	10 234	NMP	32 544 N 118 322 W
7	93	5	7.1	84/04/25	10 284		33 011 N 118 360 W
7	91	175	8.1	84/04/25	10 300	NW HARBOR ISLET	33 026 N 118 350 W
8	91	1	1.1	84/07/05	10 260		32 524 N 118 248 W
8	93	1	2.1	84/07/05	10 297		32 485 N 118 210 W
8	91	100	3.1	84/07/05	10 400	NW HARBOR ISLET	33 021 N 118 356 W
9	91	150	1.1	84/07/24	9 490	SMP	32 528 N 118 308 W
9	91	10	1.2	84/07/24	9 495	SMP	32 530 N 118 309 W
9	91	6	1.3	84/07/24	9 496	SMP	32 530 N 118 309 W
9	91	50	1.4	84/07/24	9 497	SMP	32 530 N 118 310 W
9	91	180	1.5	84/07/24	9 500	MP	32 531 N 118 311 W
9	91	25	2.1	84/07/24	9 510	NMP	32 534 N 118 312 W
9	91	55	3.1	84/07/24	9 512	NMP	32 537 N 118 314 W
9	91	1	4.1	84/07/24	9 512	NMP	32 538 N 118 314 W
9	91	45	5.1	84/07/24	9 513	NMP	32 538 N 118 316 W
9	91	2	6.1	84/07/24	9 514	NMP	32 541 N 118 317 W
9	91	13	7.1	84/07/24	9 518	NMP	32 544 N 118 322 W
9	91	135	8.1	84/07/24	9 580	NW HARBOR ISLET	33 026 N 118 350 W
10	91	75	1.1	84/10/16	10 334	SMP	32 529 N 118 308 W
10	91	30	1.2	84/10/16	10 335	SMP	32 530 N 118 310 W
10	91	2	1.3	84/10/16	10 336	SMP	32 530 N 118 310 W
10	91	0	1.4	84/10/16	10 337	MP	32 531 N 118 311 W
10	91	8	2.1	84/10/16	10 340	NMP	32 538 N 118 316 W
10	91	2	3.1	84/10/16	10 350	NMP	32 544 N 118 322 W
10	91	50	4.1	84/10/16	10 419	NW HARBOR ISLET	33 026 N 118 350 W

Table 3. Observed age class distributions for northern elephant seals within the study area at San Clemente Island, by collection period, during 1984.

Trip Period Date	Adult Male	Adult Female	Subadult M	Subadult F	Unclassified	Yearling	Weaned Pup	Unweaned Pup	Total
1/19-23	2	2	4	0	0	12	0	2	22
2/23-27	0	1	0	0	0	1	2	1	5
3/23-26	0	2	0	2	1	5	0	3	13
5/3-7	0	1	0	0	7	22	23	0	53
6/14-18	0	0	0	0	1	0	0	0	1
7/20-23	0	0	0	0	0	0	0	0	0
7/26-27	0	0	0	0	0	0	0	0	0
9/19-24	0	0	0	0	8	7	0	0	15
11/16-19	0	0	0	0	0	4	11	0	15

Table 4. Numbers of California sea lion scats and spewings collected within the study area at San Clemente Island during 1984.

Trip Period Date	Area of Collection[1]	NUMBER OF SCATS AND SPEWINGS COLLECTED Fresh scats	Dry scats	Spewings	Totals
1/19-23	SMP, MP	24	27	0	51
2/23-27	SMP, MP	32	23	0	55
3/23-26	SMP, MP, NMP	43	27	0	72
5/3-7	SMP, NMP	39	9	0	48
6/14-18	SMP	43	2	0	45
7/20-23	SMP	25	1	0	26
7/26-27	SMP	20	0	1	21
9/19-24	SMP, MP	11	28	0	39
11/16-19	SMP	2	12	0	14
TOTALS		239	129	1	369

[1]SMP - "Arch Rock" to Mail Point (1.4 km of coastline)
MP - Mail Point Area (0.5 km of coastline)
NMP - Mail Point to Seal Cove Point (4.0 km of coastline)

Table 5a. Positively identified prey found in 324 California sea lion scats and 1 spewing collected within the study area at San Clemente Island during 1984. Data are presented for the number and percent frequency of occurrence (PFO) from all samples in which a prey item was recovered.

PREY SPECIES		Numbers of Occurrences for Total Sample	PFO for Total Sample
Scientific Name	Common Name	N	%
Engraulis mordax	Northern anchovy	162	50.0
Pleuroncodes planipes	Pelagic red crab	89	27.4
Merluccius productus	Pacific whiting	86	26.5
Sebastes spp.	Rockfish	63	19.4
Octopus spp.	Octopus	48	14.8
Chromis punctipinnis	Blacksmith	33	10.2
Trachurus symmetricus	Jack mackerel	24	7.4
Scomber japonicus	Pacific mackerel	20	6.2
[1]Unidentified fish spp.		18	5.5
MYCTOPHIDAE	Lanternfish	11	3.4
Loligo opalescens	Market squid	6	1.8
Onychoteuthis borealijaponicus	Squid	6	1.8
[1]Unidentified cephalopod spp.	Squid or octopus	5	1.5
Microstomus pacificus	Dover sole	3	0.9
Unidentified fish tooth		3	0.9
Abraliopsis felis	Squid	2	0.6
Icichthys lockingtoni	Medusafish	2	0.6
Lycodes (Aprodon) cortezianus	Bigfin eelpout	2	0.6
Semicossyphus pulcher	California sheephead	2	0.6
Unidentified flatfish spp.		2	0.6
Mastigoteuthis pyrodes	Squid	1	0.3
Oxyjulis californica	Senorita	1	0.3
Glyptocephalus zachirus	Rex sole	1	0.3
Lyopsetta exilis	Slender sole	1	0.3
Porichthys notatus	Plainfin midshipman	1	0.3
Atherinops affinis	Topsmelt	1	0.3
Ocythoe tuberculata	Squid	1	0.3
ATHERINIDAE	Silversides	1	0.3
ZOARCIDAE	Eelpouts	1	0.3
LABRIDAE	Wrasses	1	0.3
Galeorhinus galeus	Soupfin shark	1	0.3
Unidentified crustacean parts		1	0.3
TOTAL NUMBER OF OCCURRENCES		599	

[1]Unidentified species are not included in Table 5b.

Table 5b. Questionable prey identifications found in 324 California sea lion scats and 1 spewing collected within the study area at San Clemente Island during 1984. Data are presented for the number and percent frequency of occurrence (PFO) from all samples in which a prey item was recovered.

PREY SPECIES		Numbers of Occurrences for Total Sample	PFO for Total Sample
Scientific Name	Common Name	N	%
Sebastes spp.	Rockfish	6	1.8
Engraulis mordax	Northern anchovy	3	0.9
MYCTOPHIDAE	Lantern fish	2	0.6
GONATIDAE	Squid and octopus	2	0.6
Merluccius productus	Pacific whiting	1	0.3
Trachurus symmetricus	Jack mackerel	1	0.3
Scomber japonicus	Pacific mackerel	1	0.3
SCOMBRIDAE	Mackerels and tunas	1	0.3
Lycodes (Aprodon) cortezianus	Bigfin eelpout	1	0.3
Paralabrax clathratus	Kelp bass	1	0.3
GOBIIDAE	Gobies	1	0.3
Abraliopsis felis	Squid	1	0.3
Unidentified fish tooth		1	0.3
TOTAL NUMBER OF OCCURRENCES		22	

Table 6. Summary of dead California sea lions observed stranded at San Clemente Island during 1984.

	Seal Cove Point to The Shack			The Shack to Lost Point			Other Areas			Totals		
Trip Period Dates	1983 Pups	1984 Pups	Non-Pups	1983 Pups	1984 Pups	Non-Pups	1983 Pups	1984 Pups	Non-Pups	1983 Pups	1984 Pups	Non-Pups
1/19-23	16[1]	0	0	1	0	4	Not Surveyed			17[1]	0	4
2/23-27	2	0	0	5	0	7	Not Surveyed			7	0	7
3/23-27	6[2]	1[3]	2	Not Surveyed			Not Surveyed			6[2]	1[3]	2
5/3-7[4]	3	2[3]	1	2	0	2	Not Surveyed			5	2[3]	3
6/14-18[4]	2	0	0	1	0	1	Not Surveyed			3	0	1
7/20-23[4]	0	0	0	Not Surveyed			Not Surveyed			0	0	0
7/26-27	0	3	0	Not Surveyed			Not Surveyed			0	3	0
9/19-24[4,5]	3[6]	7	1	Not Surveyed			3	1	3	6[6]	8	4
10/30-31[7]	Not Surveyed			Not Surveyed			0	6	3	0	6	3
11/16-19[4]	0	2	2	0	0	0	Not Surveyed			0	2	2
TOTALS	32	15	6	9	0	14	3	7	6	44	22	26

1 San Clemente Island tags observed on one dead California sea lion (tag 248).
2 San Clemente Island tags observed on one dead California sea lion (tags 244).
3 These specimens were catorgized as premature births.
4 Incomplete survey at Mail Point
5 The China Point area was surveyed on September 23, 1984
6 San Clemente Island tags observed on one dead California sea lion (tags 345).
7 The Northwest Harbor Islet was survyed on October 31, 1984

Table 7. Chi-square and heterogeneity chi-square analyses of sex ratio data for California sea lion pups captured, tagged, and weighed at San Clemente Island during 1982-1984.

	Number of Pups Weighed			
Year	Males	Females	Chi-square	d.f.
1982	54	62	0.54	1
1983	66	66	0.00	1
1984	75	70	0.17	1
Total of chi-squares			0.71	3
Pooled chi-square of totals	195	198	0.02	1
Heterogeneity chi-square (0.75<P<0.50)			0.69	2

Table 8. Numbers and mean weights of California sea lion pups captured, tagged, and weighed at San Clemente Island during 1984.

Sex	Number of Tagged 1984 Pups	Mean Weight of 1984 Pups	SD
Males	75 (51.7%)	14.6 kg (N=75)	3.4
Females	70 (48.3%)	13.1 kg (N=70)	2.7
Both	145		

Table 9. Newman-Keuls multiple range test with unequal sample sizes for mean male pup weights ($\bar{x}$) within different years, (Year 1 (1984) = 14.6 kg; Year 2 (1983) = 16.1 kg; Year 3 (1982) = 21.5 kg).

Comparison of years (B vs. A)	Difference of means ($\bar{X}_B - \bar{X}_A$)	SE	q	p	$q^{0.05,\infty,p}$
3 vs. 1	6.9	0.48	14.37	3	3.314
3 vs. 2	5.4	0.49	11.02	2	2.772
2 vs. 1	1.5	0.45	3.33	2	2.772

Overall conclusion : $\mu_1 \neq \mu_2 \neq \mu_3$

Table 10. Newman-Keuls multiple range test with unequal sample sizes for mean female pup weights ($\bar{x}$) within different years, (Year 1 (1984) = 13.1 kg; Year 2 (1983) = 13.6 kg; Year 3 (1982) = 18.7 kg).

Comparison of years (B vs. A)	Difference of means ($\bar{X}_B - \bar{X}_A$)	SE	q	p	$q^{0.05,\infty,p}$
3 vs. 1	5.6	0.40	14.00	3	3.314
3 vs. 2	5.1	0.41	12.44	2	2.772
2 vs. 1	0.5	0.39	1.28	2	2.772

Overall conclusion : $\mu_1 = \mu_2 \neq \mu_3$

Table 11. Resights of live tagged pinnipeds, from other areas, observed within the study area at San Clemente Island during 1984.

Tag Resight Date	Tag Number, Color, Type and Placement	Observed Age	Species	Area Where Animal Was Tagged
January 20, 1984	4205 Red Riese Both Rear Flippers	Yearling	Mirounga angustirostris	San Nicolas Island
February 25, 1984	?100 Orange Temple[1] Right Foreflipper	Subadult	Zalophus californianus	Rehabilitation Center
May 4, 1984	247 Blue Riese Both Foreflippers	Pup	Zalophus californianus	Santa Barbara Island
May 5, 1984	Red Riese[1] Both Rear Flippers	Yearling	Mirounga angustirostris	San Nicolas Island
May 5, 1984	Yellow Riese[1] Both Rear Flippers	Pup	Mirounga angustirostris	San Miguel Island
May 5, 1984	Yellow Riese[1] Both Rear Flippers	Yearling	Mirounga angustirostris	San Miguel Island
May 5, 1984	Metal Monel[1] Left Foreflipper	Adult	Zalophus californianus	Rehabilitation Center
November 17, 1984	B??? Red Riese[1] Both Rear Flippers	Pup	Mirounga angustirostris	San Nicolas Island

[1]Tag numbers were either illegible or not visible.

Table 12. Unique resights of San Clemente Island-tagged California sea lions and northern elephant seals, observed within the study area at San Clemente Island, by month, during 1984.

	CALIFORNIA SEA LIONS						NORTHERN ELEPHANT SEALS	
	1983 Pups		1984 Pups		Non-Pups			
Month	Tags Read	Tags Unread	Tags Read	Tags Unread	Tags Read	Tags Unread	Tags Read	Tags Unread
Jan	17(1)[1]	2	-	-	0	0	0	0
Feb	19	0	-	-	0	0	0	0
Mar	12(1)[2]	5	-	-	0	0	0	1[3]
Apr	-No Trip-							
May	7	6	-	-	0	1	1[4]	1[5]
June	9	6	-	-	0	0	0	0
July[6]	12	5	-	-	0	1	0	0
Aug	-No Trip-							
Sept	4(1)[7]	1	-	-	0	0	0	0
Oct	-No Trip-							
Nov	3	1	35	9	0	0	0	0
Dec	-No Trip-							

[1] San Clemente Island tags observed on one dead California sea lion pup (tag 248).
[2] San Clemente Island tags observed on one dead California sea lion pup (tags 244).
[3] San Clemente Island tags observed on one live, adult female elephant seal (tag 07? Roto).
[4] San Clemente Island tags observed on one live, yearling elephant seal (tag 369).
[5] San Clemente Island tags observed on one live, elephant seal pup (tag ???).
[6] Unique tag resights are included for both trip periods, July 20-23 and 26-27, in July 1984.
[7] San Clemente Island tags observed on one dead California sea lion pup (tags 245).

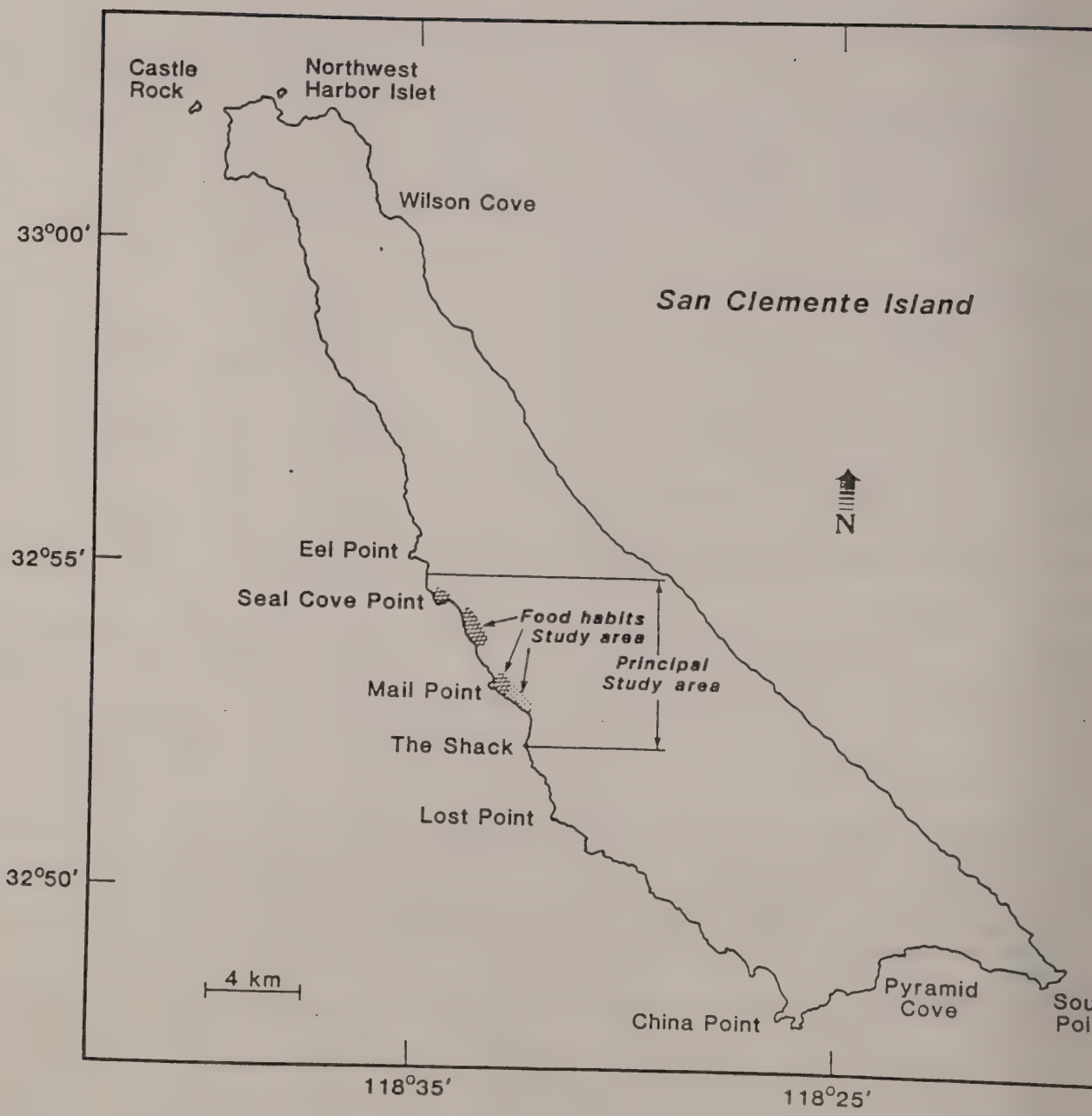


Figure 1. Map of San Clemente Island showing the study area. Observed breeding areas are indicated by crosshatch. Areas used primarily as haulouts are indicated with stipple.

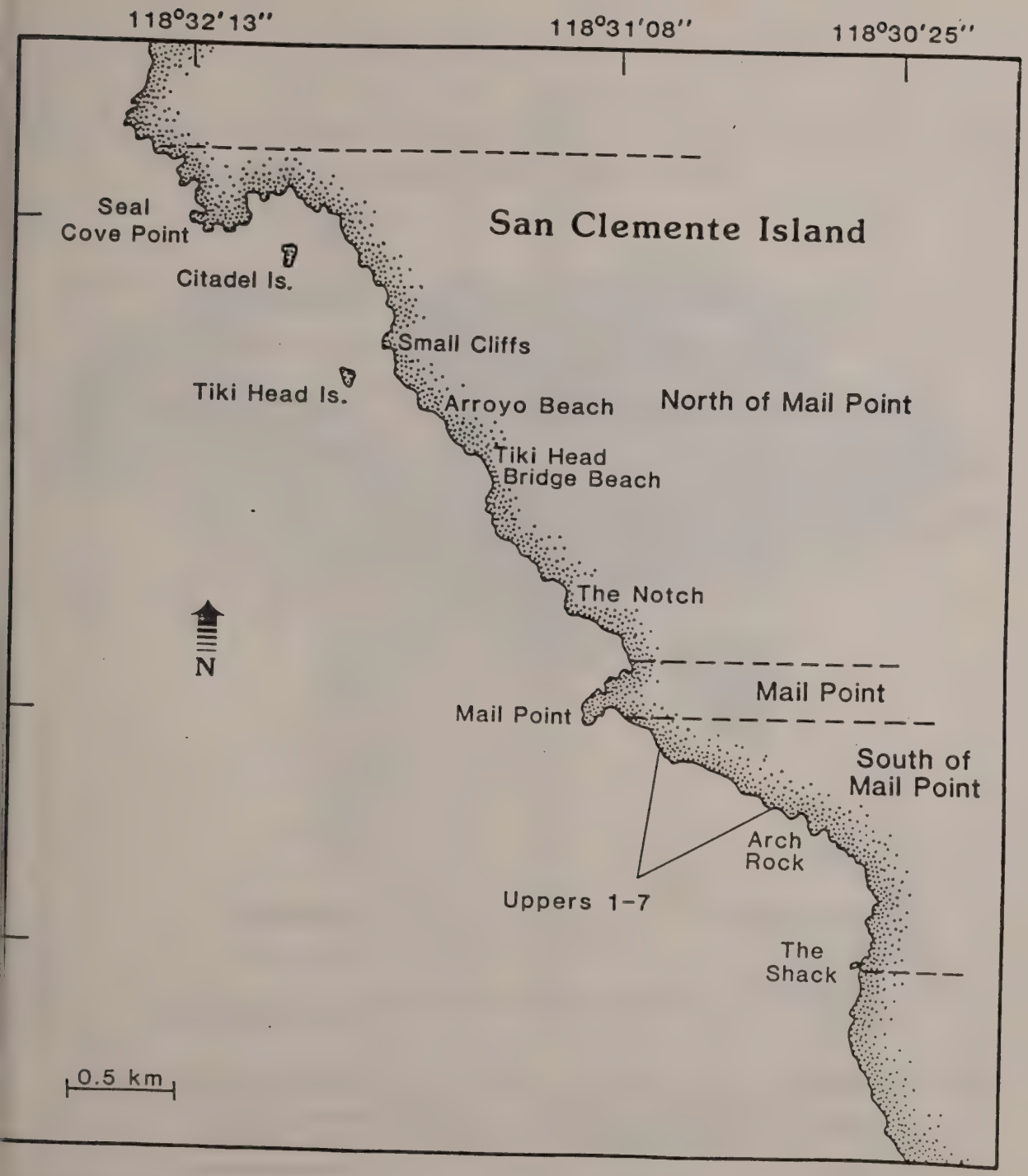


Figure 2. San Clemente Island pinniped study area indicating the locations of the three sub-areas.

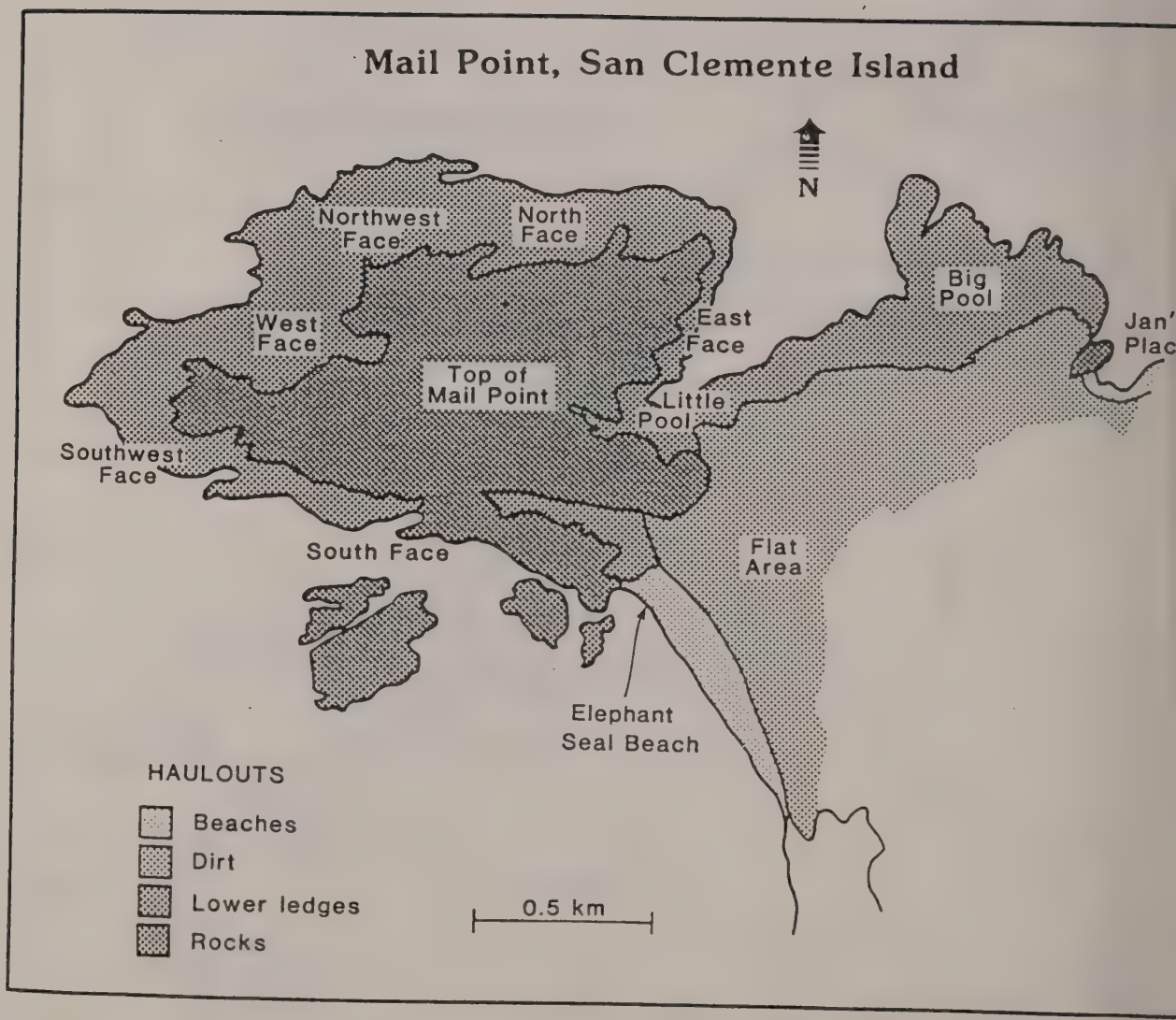


Figure 3. Haulout and breeding areas for California sea lions (Zalophus californianus) and northern elephant seals (Mirounga angustirostris) at Mail Point.

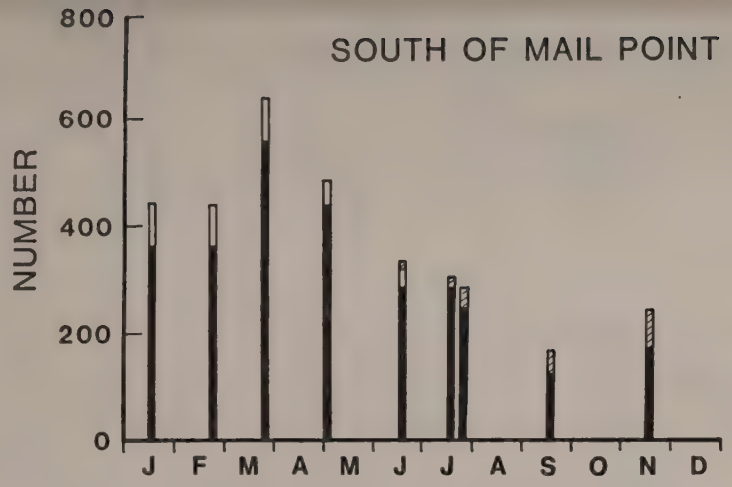


Figure 4. Total numbers of California sea lions censused south of Mail Point at San Clemente Island during 1984.

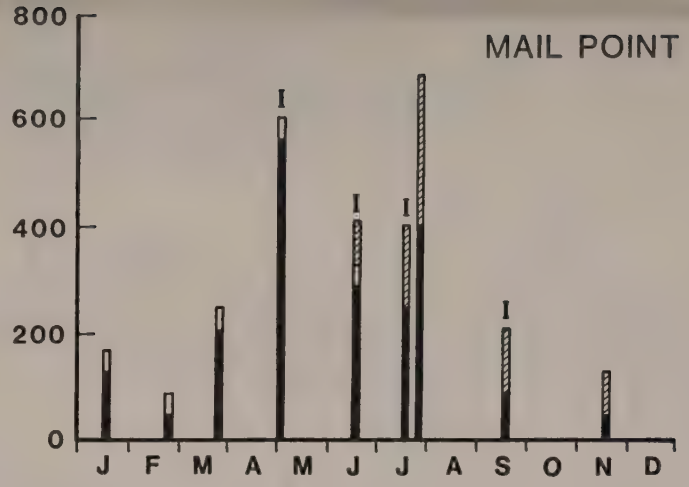


Figure 5. Total numbers of California sea lions censused in the Mail Point area at San Clemente Island during 1984. Incomplete counts at Mail Point are indicated as (I).

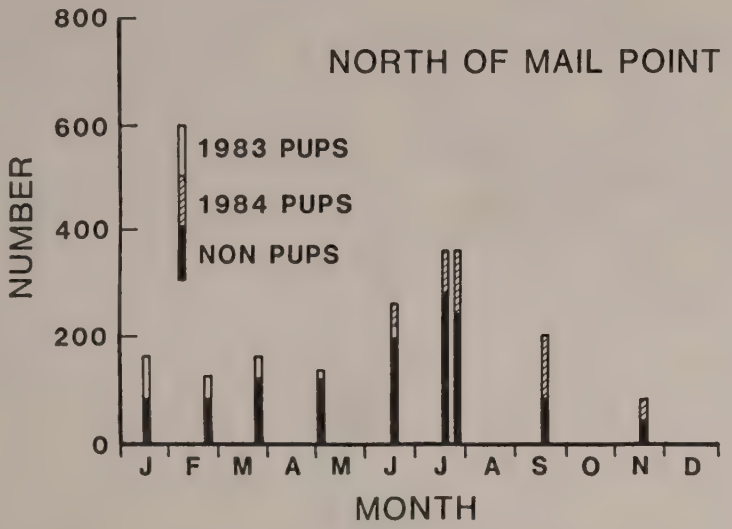


Figure 6. Total numbers of California sea lions censused north of Mail Point at San Clemente Island during 1984.

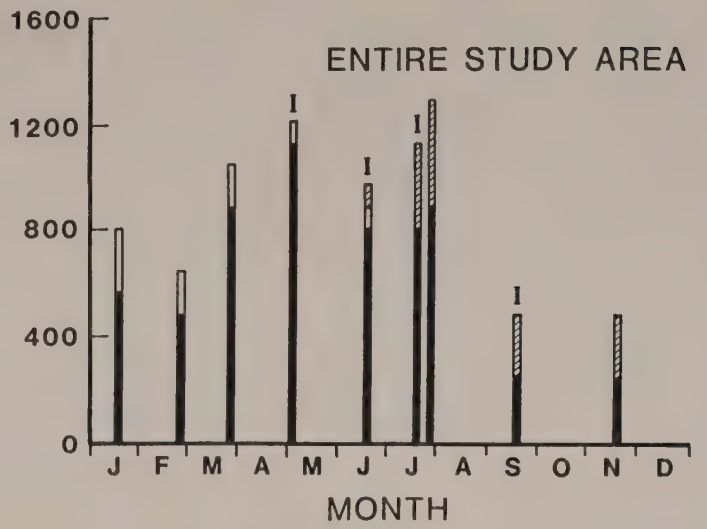


Figure 7. Total numbers of California sea lions censused within the study are at San Clemente Island during 1984. Incomplete counts at Mail Point are indicated as (I).

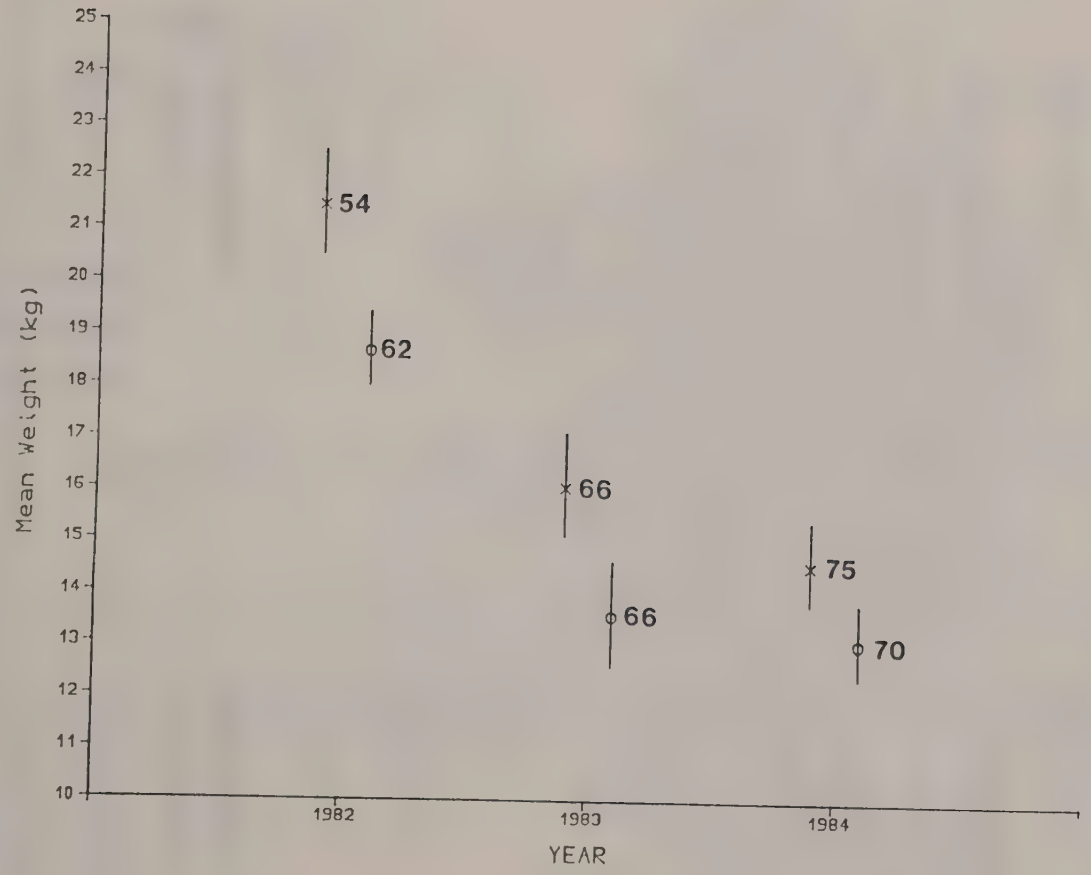
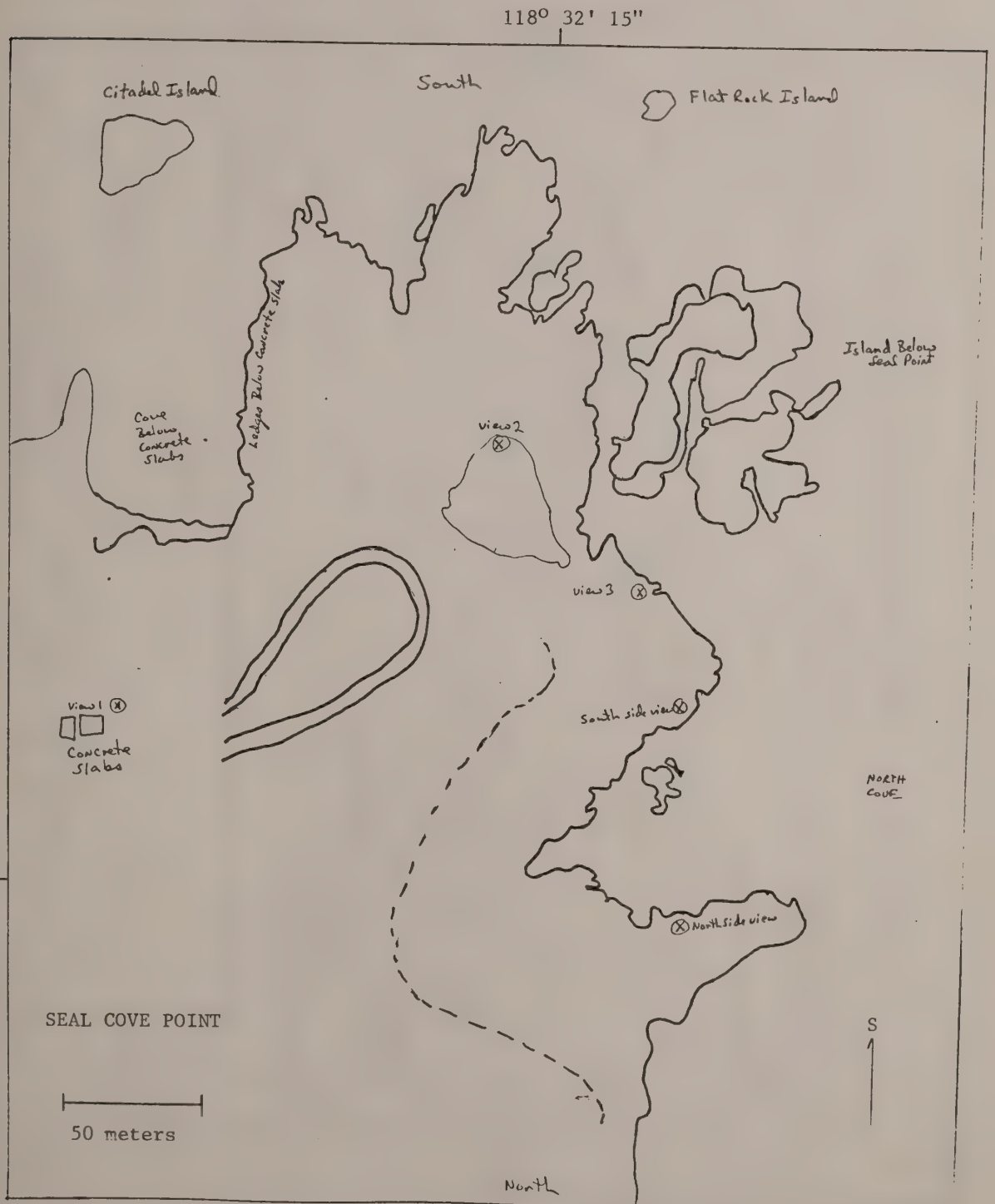


Figure 8. California sea lion mean pup weights for males (x) and females (o) at San Clemente Island during 1982-1984. The 95% confidence interval above and below the mean is represented by a vertical line and the sample size is indicated for each representation.

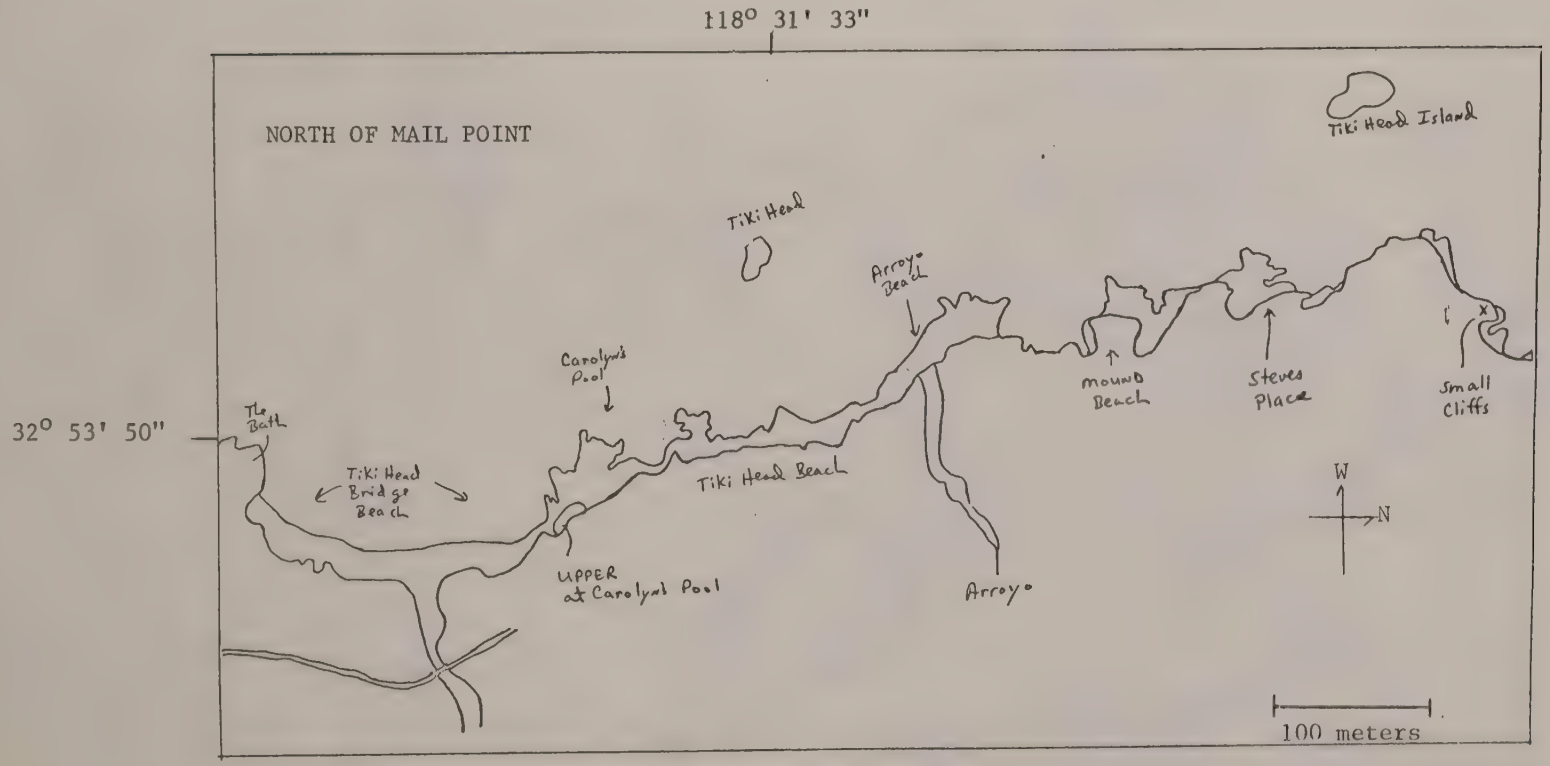
Appendix I. San Clemente Island census area field form (1 of 7).



Date:
Observer:
Beaufort:
Surf:

Start Time:
End Time:

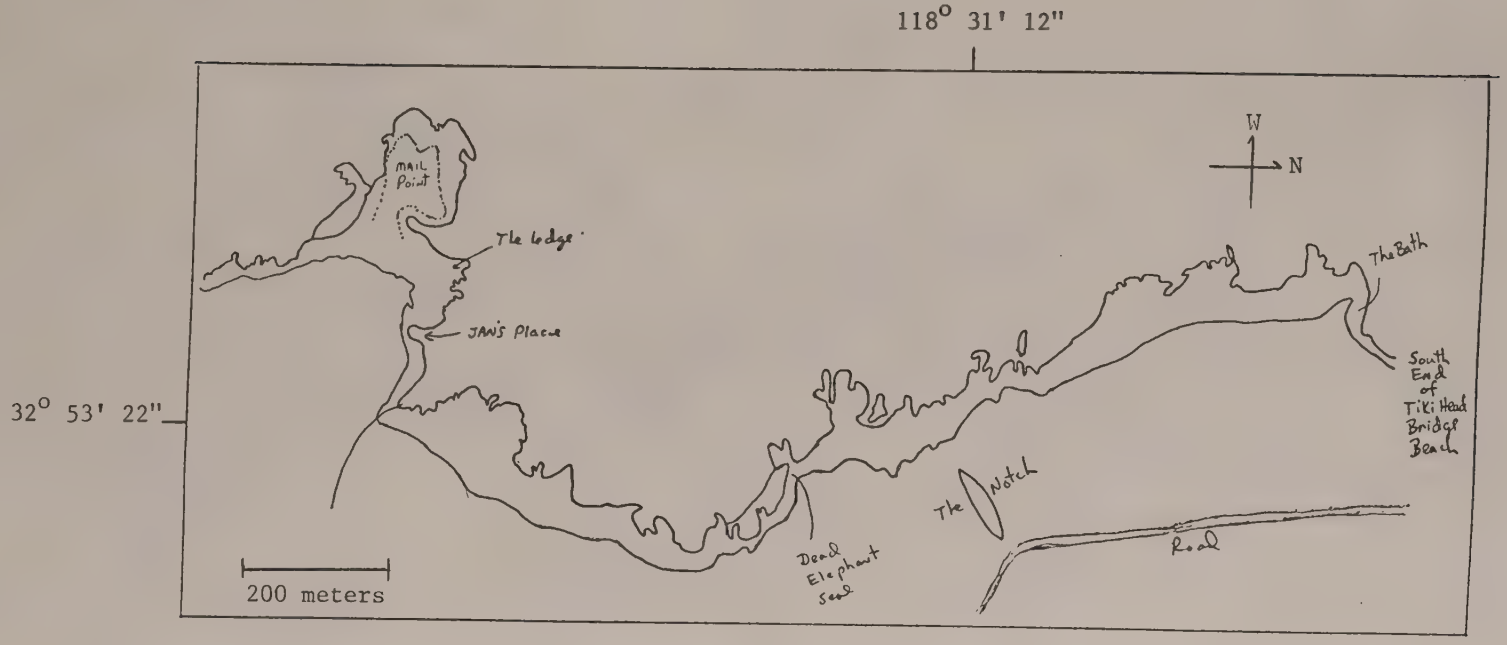
Appendix I. San Clemente Island census area field form (2 of 7).



Date:
Observer:
Beaufort:
Surf:

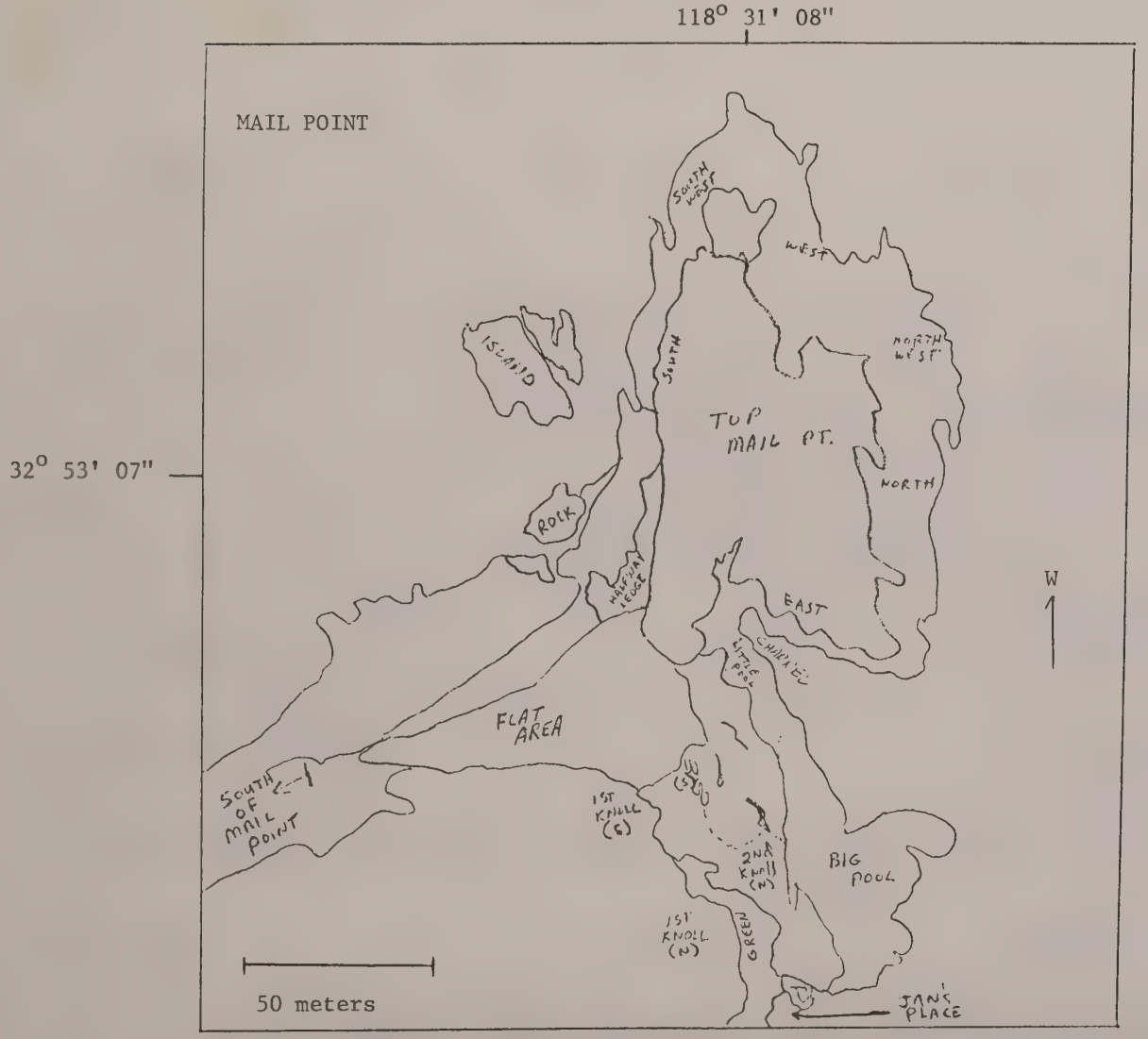
Start Time:
End Time:

Appendix I. San Clemente Island census area field form (3 of 7).



Date:
Observer:
Beaufort:
Surf:

Start Time:
End Time:

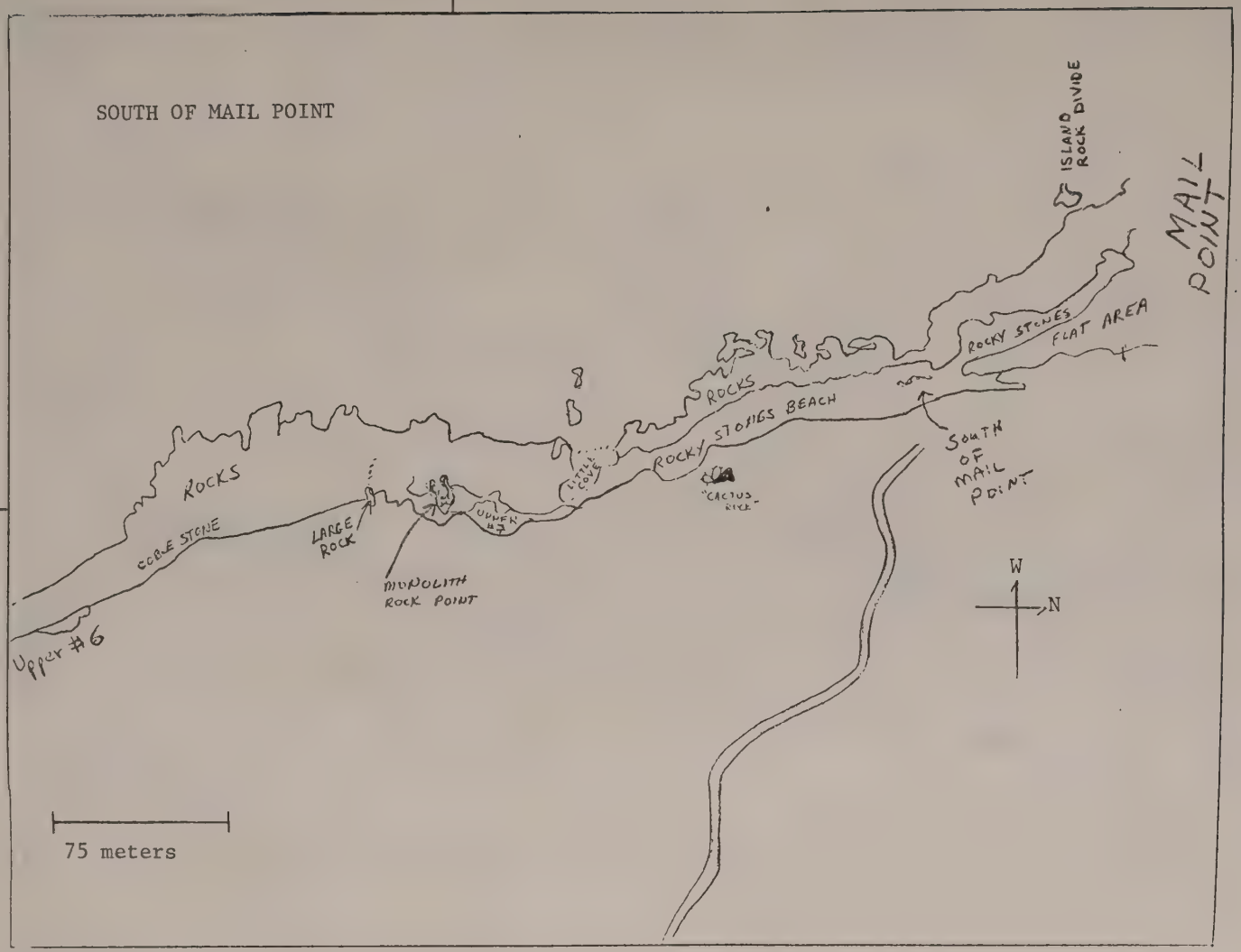


Date:
Observer:
Beaufort:
Surf:

Start Time:
End Time:

118° 30' 55"

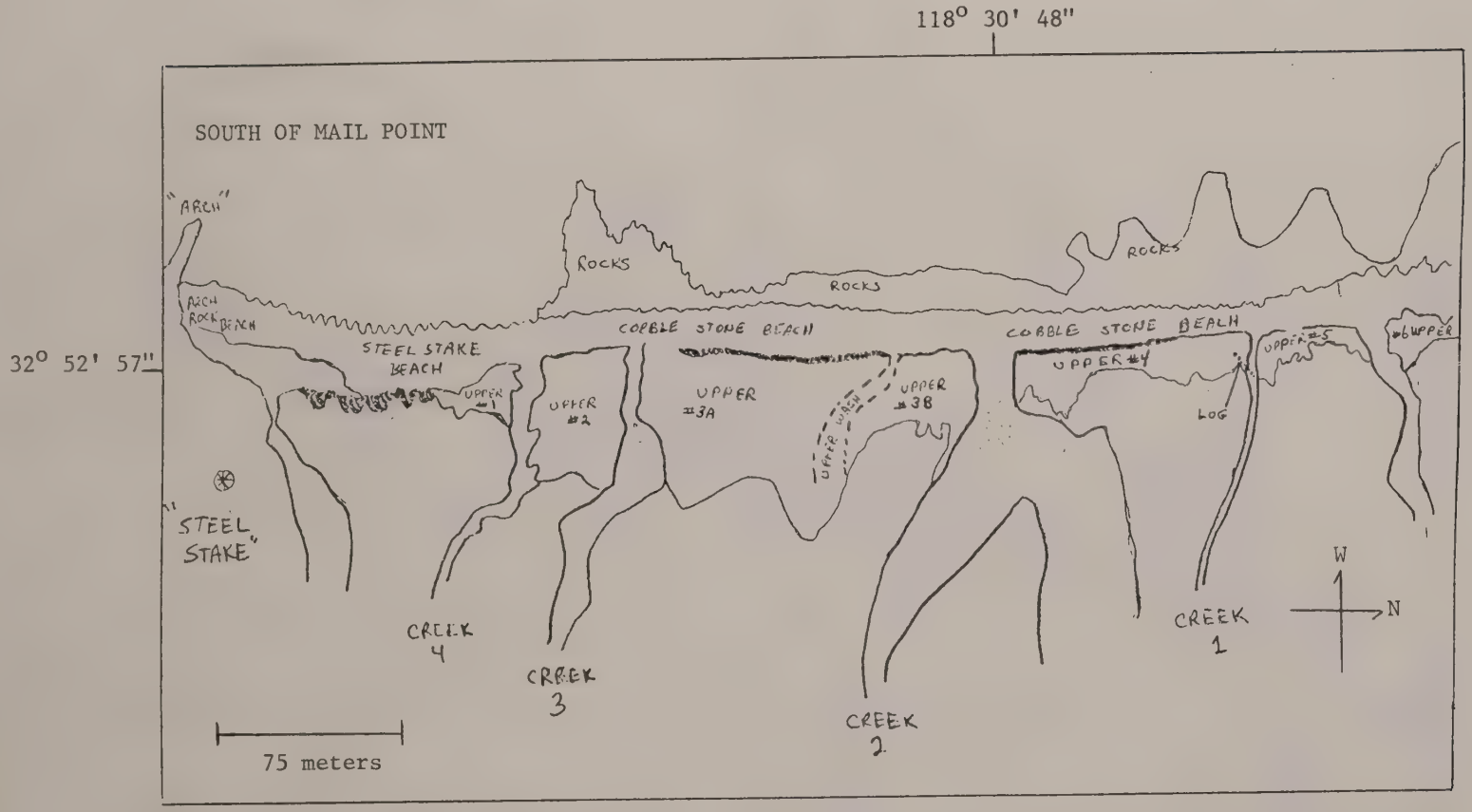
32° 52' 59"



Date:
Observer:
Beaufort:
Surf:

Start Time:
End Time:

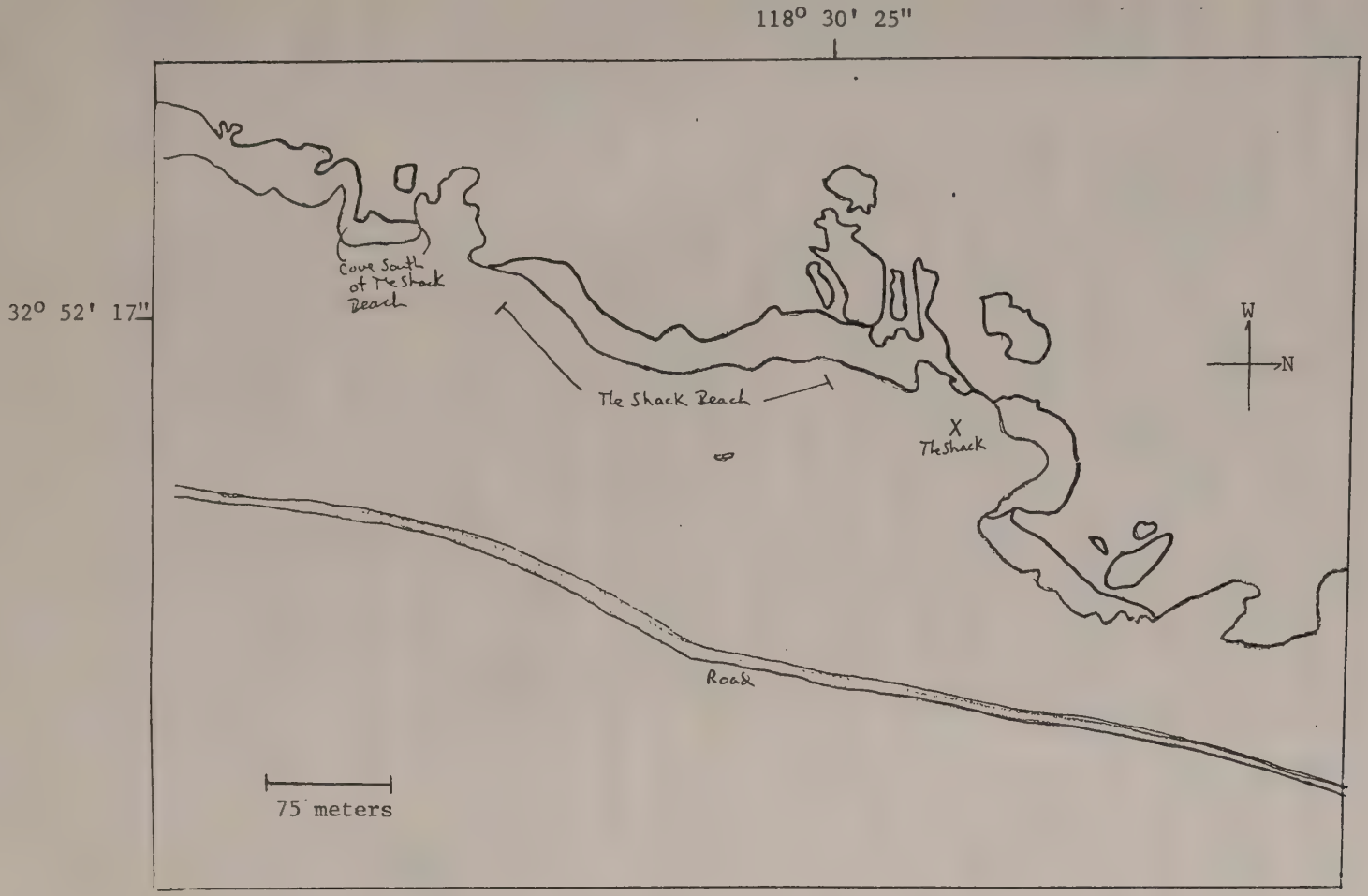
Appendix I. San Clemente Island census area field form (6 of 7).



Date:
Observer:
Beaufort:
Surf:

Start Time:
End Time:

Appendix I. San Clemente Island census area field form (7 of 7).



Date:
Observer:
Beaufort:
Surf:

Start Time:
End Time:

APPENDIX II.
PINNIPED LIFE HISTORY FORM

SPECIMEN NO[1 – 7] CARD NO[1] 9 DATE[10] YR MO D

SPECIES[16] SEX[19] STANDARD LENGTH[20 . 23] + [24]

LOCALITY[26] CARCASS CONDITION

POSITION[30 – 36] [37 – 44] CARCASS DISPOSITION

STOMACH: EXAM[47] CONT COLL[48] TEETH COLL[49] HEAD COLL[50] BACULUM COLL

MANDIBLES COLLECTED: LEFT[52] RIGHT[53] BLUBBER THICKNESS[. 54]

GUNSHOT[57] PREDATOR WOUNDS[58] FISH GEAR[59] FISH GEAR SCARS[60]

GONADS COLL[61] PHOTOS[62] END OF COLLECTION DATA?[63]

Skull retained[65] Skeleton retained[66] Gonad wt: L[67 . 70] R[71 .

Sexual maturity[75] Fetus: sex[76] wt[77 . 80] Spec.no.[1 – 7]

Fetus: length[10 . 13] coll[14] Lactating[15] Parasites: exam[16] coll[

Tissues collected: kidney[19] liver[20] blood/fluids[21] brain[22] blubber[

other (specify)[ ]

Curvilinear length[25 – 28] Axillary girth[30 – 33]

Anterior length: foreflip[34 . 37] hindflip[38 . 41] Weight[42 .

Tags[47] Tags coll[48] Necropsied[50] Date of necropsy[51 .]

Cause of Death: Primary[58] Secondary[60] Tertiary[62]

Dentinal tooth counts[64] Cementum tooth counts[66]

NOTES:

Collected by: _____

APPENDIX II. PINNIPED LIFE HISTORY FORM (Continued)

CODES AND EXPLANATIONS FOR PINNIPED LIFE HISTORY FORM
ALL LINEAR MEASUREMENTS ARE MADE IN CENTIMETERS

Sex: 1=Male, 2=Female, 3=Unidentified
Standard length: Straight line distance from tip of nose to tip of tail while specimen is on back. To nearest Ø.1 cm.
±: Error of standard length measurement
Carcass condition: 1=Alive, 2=Freshly dead, 3=Moderately decomposed, 4=Advanced decomposition, 5=Old carcass (mummified or skeletal remains)
Carcass disposition: 1=Dumped at landfill, 2=Buried at site, 3=Left at site, 4=Collected, 5=Other
Stomach examined: 1=Yes, 2=No
Stomach contents coll.: 1=Yes, 2=No, 3=No contents
Teeth coll.: 1=Yes, 2=No, 3=None available
Head coll.: 1=Yes, 2=No
Baculum coll.: 1=Yes, 2=No
Mandibles coll.(Right and Left): 1=Yes, 2=No, 3=Not available
Blubber thickness: Thickness of skin and blubber at posterior end of sternum. To the nearest tenth of centimeter.
Gunshot: 1=Yes, 2=No, 3=Unknown, 4=Possibly
Predator wounds: 1=Yes, 2=No, 3=Unknown, 4=Possibly
Fishing gear: 1=Yes, 2=No
Fishing gear scars: 1=Yes, 2=No, 3=Unknown, 4=Possibly
Gonads coll.: 1=Yes, 2=No
Photos: 1=Yes, 2=No
End of data: 1=Yes, 2=No
Skull retained: 1=Yes, 2=No
Skeleton retained: 1=Yes, 2=No
Gonad wt. (Left and Right): Weight to nearest tenth of gram
Fetus sex: 1=Male, 2=Female, 3=Unable to determine
Fetus wt.: Weight to nearest tenth of gram
Fetus length: Length to nearest tenth of centimeter
Fetus coll.: 1=Yes, 2=No
Lactating: 1=Yes, 2=No, 3=Unable to determine
Parasites examined: 1=Yes, 2=No, 3=Unable to determing
Parasites coll.: 1=Yes, 2=No
Tissues coll.: 1=Yes, 2=No
Curvilinear length: The length of the specimen from the tip of the nose to tip of the tail measured dorsally with a tape to nearest tenth of centimeter.
Axillary girth: The circumference of the carcass at the axilla measured to the nearest .5 centimeter.
Anterior length of foreflipper and hindflipper: The length of the anterior edge of the flipper in a straight line from the insertion to the tip of first claw to nearest tenth of centimeter.
Weight: To the nearest tenth kilogram
Tags: 1=Yes, 2=No
Tags coll.: 1=Yes, 2=No
Necropsied: 1=Yes, 2=No

Appendix III. Dead strandings of California sea lions salvaged on San Clemente Island during 1984.

DATE	SPECIMEN NUMBER	SPECIES[1]	LATITUDE	LONGITUDE	SEX[2]	AGE CLASS[3]	TAGS PRESENT	SPECIMEN PART COLLECTED TEETH ?	SKULL ?
840119	JBW0015	Z	32 53'22''N	118 31'12''W	U	P83			
840120	CWO0895	Z	32 53'00''N	118 30'52''W	U	P83			
840120	CWO0896	Z	32 53'07''N	118 31'08''W	U	P83			
840120	JBW0016	Z	32 52'58''N	118 30'52''W	U	P83			
840120	JBW0017	Z	32 53'07''N	118 31'08''W	U	P83			
840120	JBW0018	Z	32 53'07''N	118 31'04''W	U	P83			
840121	CWO0897	Z	32 53'10''N	118 31'07''W	U	P83			
840121	CWO0898	Z	32 53'07''N	118 31'04''W	U	P83			
840121	CWO0899	Z	32 53'07''N	118 31'04''W	U	P83			
840121	CWO0900	Z	32 51'55''N	118 30'16''W	U	SA			
840121	CWO0901	Z	32 52'13''N	118 30'25''W	F	A			
840121	CWO0902	Z	32 52'13''N	118 30'25''W	U	P83			
840121	CWO0903	Z	32 52'43''N	118 30'45''W	U	P83			
840121	CWO0904	Z	32 52'43''N	118 30'45''W	U	P83			
840121	JBW0019	Z	32 53'10''N	118 31'07''W	M	P83	YES(248)		
840121	JBW0020	Z	32 53'07''N	118 31'04''W	U	P83			
840121	JBW0021	Z	32 53'07''N	118 31'04''W	U	P83			
840121	JBW0022	Z	32 53'07''N	118 31'04''W	U	P83			
840121	JBW0023	Z	32 51'53''N	118 30'16''W	U	SA			
840121	JBW0024	Z	32 52'13''N	118 30'25''W	U	SA			
840121	JBW0025	Z	32 52'43''N	118 30'40''W	U	P83			
840224	JBW0026	Z	32 52'58''N	118 30'52''W	U	P83			
840225	JBW0027	Z	32 53'10''N	118 31'07''W	U	P83			
840225	JBW0028	Z	32 51'20''N	118 29'55''W	U	P83			
840225	JBW0029	Z	32 51'20''N	118 29'55''W	U	SA			
840225	JBW0030	Z	32 51'26''N	118 29'55''W	U	SA			
840225	JBW0031	Z	32 51'26''N	118 29'55''W	U	A			
840225	JBW0032	Z	32 51'30''N	118 29'58''W	F	A			
840225	JBW0033	Z	32 51'30''N	118 30'00''W	U	P83			
840225	JBW0034	Z	32 51'50''N	118 30'15''W	U	P83			
840225	JBW0035	Z	32 51'50''N	118 30'15''W	F	A			
840225	JBW0036	Z	32 51'55''N	118 30'15''W	U	SA			
840225	JBW0037	Z	32 51'53''N	118 30'16''W	U	P83			
840225	JBW0038	Z	32 52'05''N	118 30'20''W	U	P83			
840225	JBW0039	Z	32 52'13''N	118 30'25''W	U	A			
840323	CWO0905	Z	32 53'50''N	118 31'33''W	U	A			
840323	CWO0906	Z	32 53'50''N	118 31'33''W	U	P83			

[1] SPECIES: M=Northern elephant seal (Mirounga angustirostris)
Z=California sea lion (Zalophus californianus)
P=Harbor seal (Phoca vitulina richardsi)

[2] SEX: M=Male; F=Female; U=Unknown

[3] AGE CLASS: P83=Pup of 1983; P84=Pup of 1984; Y=Yearling; J=Juvenile; SA=Subadult; A=Adult; U=Unknown; PRE=Premature

Appendix III. continued.

DATE	SPECIMEN NUMBER	SPECIES[1]	LATITUDE	LONGITUDE	SEX[2]	AGE CLASS[3]	TAGS PRESENT	SPECIMEN PARTS COLLECTED: TEETH ?	SPECIMEN PARTS COLLECTED: SKULL ?
840323	JBW0040	Z	32 53'22''N	118 31'12''W	F	SA			
840324	CWO0907	Z	32 53'07''N	118 31'04''W	U	P83			
840324	CWO0908	Z	32 53'07''N	118 31'04''W	U	P83			
840324	CWO0909	Z	32 53'07''N	118 31'04''W	F	P83	YES(244)	YES	YES
840324	JBW0041	Z	32 53'07''N	118 31'08''W	U	P83			
840324	JBW0042	Z	32 53'10''N	118 31'07''W	U	PRE			
840324	JBW0043	Z	32 52'43''N	118 30'40''W	U	P83			
840503	JBW0044	Z	32 53'43''N	118 31'25''W	U	P83			
840503	JBW0045	Z	32 53'43''N	118 31'25''W	U	P83			
840503	JBW0046	Z	32 53'43''N	118 31'25''W	U	P83			
840503	JBW0047	Z	32 53'43''N	118 31'25''W	F	SA			
840506	JBW0048	Z	32 52'13''N	118 30'25''W	U	P83			
840506	JBW0049	Z	32 51'30''N	118 30'00''W	U	Y			
840506	JBW0050	Z	32 51'30''N	118 29'58''W	U	P83			
840506	JBW0051	Z	32 51'20''N	118 29'55''W	U	SA			
840506	JBW0052	Z	32 52'43''N	118 30'40''W	F	PRE		YES	YES
840506	JBW0053	Z	32 53'10''N	118 31'07''W	U	PRE			
840614	JBW0054	Z	32 53'22''N	118 31'12''W	U	P83			
840615	JBW0055	Z	32 53'00''N	118 30'57''W	U	P83			
840617	JBW0056	Z	32 52'13''N	118 30'25''W	U	P83			
840617	JBW0057	Z	32 51'53''N	118 30'16''W	F	A			
840726	CWO0910	Z	32 25'31''N	118 83'10''W	U	P84			
840726	CWO0911	Z	32 53'07''N	118 31'08''W	U	P84			
840726	CWO0912	Z	32 53'07''N	118 31'08''W	U	P84			
840919	JBW0058	Z	32 53'43''N	118 31'25''W	F	A			
840920	JBW0060	Z	32 52'51''N	118 30'36''W	U	P84			
840920	JBW0061	Z	32 52'51''N	118 30'36''W	U	Y			
840920	JBW0062	Z	32 52'51''N	118 30'37''W	F	Y	YES(345)	YES	YES
840920	JBW0063	Z	32 52'51''N	118 30'37''W	U	P84			
840922	JBW0064	Z	32 53'07''N	118 31'04''W	U	P84			
840922	JBW0065	Z	32 53'07''N	118 31'04''W	U	P84			
840922	JBW0066	Z	32 53'07''N	118 31'04''W	U	P84			
840922	JBW0067	Z	32 53'07''N	118 31'04''W	U	P84			
840922	JBW0068	Z	32 53'07''N	118 31'04''W	U	P84			
840923	CWO0913	Z	32 48'06''N	118 25'30''W	U	J			
840923	CWO0914	Z	32 48'06''N	118 25'30''W	U	Y			
840923	JBW0069	Z	32 48'06''N	118 25'30''W	F	A			
840923	JBW0070	Z	32 48'06''N	118 25'30''W	U	Y			
840923	JBW0071	Z	32 48'06''N	118 25'30''W	U	Y			
840923	JBW0072	Z	32 48'06''N	118 25'30''W	U	P84			
840923	JBW0073	Z	32 48'40''N	118 24'42''W	F	A			
840924	JBW0059	Z	32 53'07''N	118 31'04''W	U	Y			
841031	CWO0915	Z	33 02'36''N	118 35'00''W	U	P84			
841031	CWO0916	Z	33 02'36''N	118 35'00''W	U	P84			
841031	CWO0917	Z	33 02'36''N	118 35'00''W	U	P84			
841031	CWO0918	Z	33 02'36''N	118 35'00''W	U	SA			
841031	CWO0919	Z	33 02'36''N	118 35'00''W	U	P84			

Appendix III. continued.

DATE	SPECIMEN NUMBER	SPECIES[1]	LATITUDE	LONGITUDE	SEX[2]	AGE CLASS[3]	TAGS PRESENT	SPECIMEN PARTS COLLECTED: TEETH ?	SPECIMEN PARTS COLLECTED: SKULL ?
841031	CWO0920	Z	33 02'36''N	118 35'00''W	U	P84			
841031	CWO0921	Z	33 02'36''N	118 35'00''W	U	A			
841031	CWO0922	Z	33 02'36''N	118 35'00''W	U	J			
841031	CWO0923	Z	33 02'36''N	118 35'00''W	U	P84			
841116	CWO0924	Z	32 53'43''N	118 31'25''W	U	SA			
841116	JBW0074	Z	32 52'57''N	118 30'48''W	U	P84			
841117	CWO0925	Z	32 51'30''N	118 30'00''W	U	SA			
841117	CWO0926	Z	32 51'50''N	118 30'12''W	U	P84			

Appendix IV. Tags applied to Northern elephant seals on San Clemente Island during 1984.

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS P=PUP Y=YEARLING J=JUVENILE S=SUBADULT A=ADULT	ANIMAL CONDITION G=GOOD F=FAIR P=POOR
363	84/03/24	0900	363	363	M	P	F
364	84/03/24	0905	364	364	M	P	F
365	84/03/24	0914		365	M	Y	G
366	84/03/24	1047	366		F	A	G
366	84/03/25	0918	366		M	S	G
367	84/03/24	1052	367	367	M	Y	G
368	84/03/24	1058	368	368	F	P	G
369	84/03/24	1102	369			Y	G
370	84/03/25	0902		370	F	A	G
371	84/03/25	0918	371		F	A	G

Appendix V. Tags applied to California sea lions on San Clemente Island during 1984.

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS P=PUP Y=YEARLING J=JUVENILE S=SUBADULT A=ADULT	ANIMAL CONDITION G=GOOD F=FAIR P=POOR	ANIMAL WEIGHT (KG)
372	84/09/21	1030	372	372	F	P	G	12.7
373	84/09/21	1030	373	373	M	P	G	12.7
374	84/09/21	1030	374	374	M	P	G	13.6
375	84/09/21	1030	375	375	F	P	G	14.9
376	84/09/21	1030	376	376	F	P	G	12.7
377	84/09/21	1030	377	377	M	P	G	13.6
378	84/09/21	1051	378	378	M	P	G	14.5
379	84/09/21	1055	379	379	M	P	F	11.3
380	84/09/21	1059	380	380	F	P	P	7.7
381	84/09/21	1110	381	381	M	P	G	14.9
382	84/09/21	1110	382	382	M	P	G	13.6
383	84/09/21	1110	383	383	F	P	F	9.5
384	84/09/21	1110	384	384	M	P	G	13.1
385	84/09/21	1110	385	385	F	P	F	10.9
386	84/09/21	1110	386	386	F	P	F	9.1
387	84/09/21	1120	387	387	M	P	F	10.0
388	84/09/21	1130	388	388	M	P	G	13.1
389	84/09/21	1130	389	389	M	P	P	6.8
390	84/09/21	1130	390	390	M	P	G	11.8
391	84/09/21	1130	391	391	F	P	G	13.6
392	84/09/21	1130	392	392	F	P	F	10.0
393	84/09/21	1130	393	393	F	P	G	12.7
394	84/09/21	1130	394	394	M	P	F	10.4
395	84/09/21	1130	395	395	M	P	G	16.3
396	84/09/21	1145	396	396	F	P	G	15.4
397	84/09/21	1300	397	397	M	P	G	22.2
398	84/09/21	1300	398	398	F	P	G	14.5
399	84/09/21	1300	399	399	F	P	F	14.9
400	84/09/21	1300	400	400	M	P	G	14.0
401	84/09/21	1300	401	401	M	P	G	16.8
402	84/09/21	1300	402	402	M	P	G	22.6
403	84/09/21	1300	403	403	M	P	G	19.0
404	84/09/21	1300	404	404	F	P	G	12.2
405	84/09/21	1300	405	405	F	P	G	14.9
406	84/09/21	1300	406	406	F	P	G	15.4
407	84/09/21	1300	407	407	F	P	G	15.9
408	84/09/21	1300	408	408	F	P	G	13.6
409	84/09/21	1300	409	409	M	P	G	15.9
410	84/09/21	1300	410	410	M	P	G	15.9
411	84/09/21	1300	411	411	F	P	G	13.6
412	84/09/21	1300	412	412	M	P	G	19.5
413	84/09/21	1300	413	413	F	P	F	12.7
414	84/09/21	1300	414	414	M	P	G	17.7
415	84/09/21	1300	415	415	F	P	G	13.6

Appendix V. continued

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS P=PUP Y=YEARLING J=JUVENILE S=SUBADULT A=ADULT	ANIMAL CONDITION G=GOOD F=FAIR P=POOR	ANIMAL WEIGHT (KG)
416	84/09/21	1300	416	416	M	P	G	14.0
417	84/09/21	1300	417	417	F	P	G	15.4
418	84/09/21	1300	418	418	F	P	G	17.2
419	84/09/21	1300	419	419	M	P	G	15.9
420	84/09/21	1300	420	420	M	P	G	15.4
421	84/09/21	1300	421	421	M	P	G	17.7
422	84/09/21	1300	422	422	F	P	G	15.9
423	84/09/21	1300	423	423	M	P	G	15.4
424	84/09/21	1300	424	424	F	P	G	15.4
425	84/09/21	1300	425	425	M	P	G	12.2
426	84/09/21	1300	426	426	M	P	G	10.0
427	84/09/21	1300	427	427	M	P	G	12.7
428	84/09/21	1300	428	428	M	P	G	18.1
429	84/09/21	1300	429	429	F	P	G	16.8
430	84/09/21	1300	430	430	M	P	G	13.6
431	84/09/21	1300	431	431	F	P	G	13.1
432	84/09/21	1300	432	432	M	P	G	11.3
433	84/09/21	1300	433	433	M	P	G	13.1
434	84/09/21	1300	434	434	F	P	G	16.3
435	84/09/21	1300	435	435	F	P	G	19.0
436	84/09/21	1300	436	436	M	P	G	11.8
437	84/09/21	1300	437	437	F	P	G	15.9
438	84/09/21	1300	438	438	M	P	G	13.6
439	84/09/21	1300	439	439	F	P	G	12.2
440	84/09/21	1300	440	440	F	Y	G	35.4
441	84/09/21	1300	441	441	M	P	G	13.1
442	84/09/21	1300	442	442	F	P	G	12.2
443	84/09/21	1300	443	443	F	P	G	10.9
444	84/09/21	1300	444	444	F	P	G	11.8
445	84/09/21	1300	445	445	F	P	G	13.1
446	84/09/21	1300	446	446	F	P	G	10.9
447	84/09/21	1300	447	447	M	P	G	18.1
448	84/09/21	1300	448	448	M	P	G	16.8
449	84/09/21	1300	449	449	M	P	G	15.9
450	84/09/21	1300	450	450	F	P	P	7.7
451	84/09/21	1300	451	451	M	P	G	22.6
452	84/09/21	1300	452	452	M	P	G	14.5
453	84/09/21	1300	453	453	M	P	G	11.8
454	84/09/21	1300	454	454	M	P	G	13.1
455	84/09/21	1300	455	455	M	P	G	12.7
456	84/09/21	1300	456	456	M	P	F	9.5
457	84/09/21	1300	457	457	M	P	G	12.2
458	84/09/21	1300	458	458	M	P	P	7.7
459	84/09/21	1300	459	459	F	P	G	13.1
460	84/09/21	1545	460	460	M	P	G	12.2
461	84/09/22	1015	461	461	F	P	F	11.8

Appendix V. continued

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS P=PUP Y=YEARLING J=JUVENILE S=SUBADULT A=ADULT	ANIMAL CONDITION G=GOOD F=FAIR P=POOR	ANIMAL WEIGHT (KG)
462	84/09/22	1015	462	462	F	P	G	14.5
463	84/09/22	1015	463	463	M	P	G	11.8
464	84/09/22	1029	464	464	F	P	F	9.1
465	84/09/22	1035	465	465	M	P	P	5.9
466	84/09/22	1035	466	466	M	P	G	11.8
467	84/09/22	1035	467	467	F	P	G	7.7
468	84/09/22	1045	468	468	F	P	G	13.1
469	84/09/22	1100	469	469	F	P	G	10.4
470	84/09/22	1100	470	470	F	P	G	9.5
471	84/09/22	1100	471	471	M	P	G	12.7
472	84/09/22	1100	472	472	M	P	G	16.8
473	84/09/22	1100	473	473	F	P	F	8.6
474	84/09/22	1100	474	474	F	P	F	8.6
475	84/09/22	1100	475	475	M	P	G	14.5
476	84/09/22	1100	476	476	F	P	G	12.7
477	84/09/22	1100	477	477	F	P	G	10.4
478	84/09/22	1100	478	478	F	P	G	12.2
479	84/09/22	1100	479	479	M	P	G	17.7
480	84/09/22	1100	480	480	M	P	G	13.1
481	84/09/22	1100	481	481	F	P	G	10.9
482	84/09/22	1100	482	482	M	P	G	20.8
483	84/09/22	1100	483	483	M	P	G	19.9
484	84/09/22	1100	484	484	M	P	G	18.1
485	84/09/22	1100	485	485	M	P	G	16.3
486	84/09/22	1100	486	486	F	P	G	15.9
487	84/09/22	1100	487	487	M	P	G	13.1
488	84/09/22	1100	488	488	M	P	G	17.2
489	84/09/22	1100	489	489	F	P	G	14.5
490	84/09/22	1100	490	490	F	P	G	13.6
491	84/09/22	1100	491	491	F	P	G	11.8
492	84/09/22	1100	492	492	F	P	G	12.2
493	84/09/22	1100	493	493	F	P	G	16.8
494	84/09/22	1100	494	494	F	P	G	17.2
495	84/09/22	1100	495	495	M	P	G	13.1
496	84/09/22	1100	496	496	F	P	G	14.0
497	84/09/22	1100	497	497	F	P	G	16.3
498	84/09/22	1100	498	498	M	P	G	13.1
499	84/09/22	1100	499	499	M	P	G	14.9
500	84/09/22	1100	500	500	F	P	G	16.3
501	84/09/22	1100	501	501	M	P	G	16.3
502	84/09/22	1100	502	502	F	P	G	13.1
503	84/09/22	1100	503	503	M	P	G	19.9
504	84/09/22	1100	504	504	M	P	G	16.3
505	84/09/22	1100	505	505	M	P	G	13.1
506	84/09/22	1100	506	506	F	P	G	13.6
507	84/09/22	1100	507	507	M	P	G	16.8

Appendix V. continued

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS P=PUP Y=YEARLING J=JUVENILE S=SUBADULT A=ADULT	ANIMAL CONDITION G=GOOD F=FAIR P=POOR	ANIMAL WEIGHT (KG)
508	84/09/22	1215	508	508	M	P		14.5
509	84/09/22	1350	509	509	F	P	F	10.4
510	84/09/22	1350	510	510	M	P	G	21.7
511	84/09/22	1350	511	511	F	P	F	9.1
512	84/09/22	1357	512	512	F	P	F	11.8
513	84/09/22	1450	513	513	M	P	G	13.1
514	84/09/22	1450	514	514	F	P	G	13.1
515	84/09/22	1450	515	515	F	P	G	20.4
516	84/09/22	1450	516	516	F	P	G	14.9
517	84/09/22	1506	517	517	F	P	G	13.1